

DEFIANCE ELECTRONICS

TECHNICAL MANUAL

COMPRESSOR-DEHYDRATOR, DENTAL EQUIPMENT

NSN 6520-00-139-1246
6520-01-398-4613

MODEL: PAC 6.7

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SECTION I

INTRODUCTION

1.1 GENERAL

This manual contains complete operating and maintenance instructions for Defiance Electronics, Compressor-Dehydrator, Dental Equipment, PAC 6.7.

1.2 DESCRIPTION AND PURPOSE

The compressor is a completely portable unit with an integral drying section which automatically regenerates the drying agent. The unit supplies compressed air, free of oil, moisture, and particulate, matter greater than 5 microns, to operate a Dental Operating and Treatment Unit. A transit case is an integral part of the compressor, the cover of which is designed to serve as a sound suppressor and protective device during normal operation. The compressor can be rapidly placed into operation and is easily maintained.

1.3 LEADING PARTICULARS

The leading particulars of the compressor are contained in Table 1.1.

1.4 EQUIPMENT SUPPLIED

Table 1-2 lists the separate items supplied with the compressor. Refer to Section VII. Parts List, for a complete list of components.

1.5 TOOLS AND TEST EQUIPMENT

The tools and test equipment required to maintain the compressor are listed in Table 1-3.

1.6 STORAGE DATA

There are no special storage requirements for the compressor.

TABLE 1-1. LEADING PARTICULARS

ITEM	CHARACTERISTIC
Power Requirements	115-230 60/50 cycles AC
Ambient Temperature	40 F to 120 F (4.4 C to 48.9 C) 14/7 AMPS
Normal Load	6.0 scfm at 60 psi
Capacity	6.0 scfm at 60 psi
Transit Case Dimensions	26.5 X 31.5 X 11.75
Weight	158 lbs
Site Requirements	20 ft. from point of use

TABLE 1-2. EQUIPMENT SUPPLIED

ITEM	DESCRIPTION
Interconnecting Air Hoses	Two 10-foot section with appropriate connectors, to connect compressor to Dental Operating and Treatment Unit.
Technical Manual	Complete Operating and Maintenance Instructions.

TABLE 1-3. TOOLS AND TEST EQUIPMENT

ITEM	USE
Multimeter	For checking voltages and continuity.
1/8" & 1/4" Allen wrenches	For removing fan and head bolts.
Ball Peen Hammer	To peen shaft keyway.
Straight Screwdriver	For removing screws.
Shop Punch	To peen shaft keyway
Adjustable open-end wrench	For removing valves and fittings
2 Torque wrenches	0-100 Ft. Lb. and 0-60 In. Lb. To torque compressor bolts.
Backing Plate C85412	Puller backing plate.
Shaft Protector C85413	Protects shaft.
Gear Puller C4232	Pull connecting rods from crank shaft.
#2 Philips Head Screwdriver	Various

SECTION II

INSTALLATION AND PREPARATION FOR USE

2.1 GENERAL

Check the transit case and contents for any signs of damage before using the unit. If any damage is apparent, refer to Section V, Maintenance Procedures, for the applicable procedure.

2.2 INSTALLATION

The compressor may be installed in any location that is not greater than 20 feet from the point of use (combined length of the interconnecting hoses supplied) and which provides protection from the elements.

CAUTION: DO NOT ALLOW WATER TO ACCUMULATE IN THE TRANSIT CASE.

2.3 PREPARATION FOR USE

To prepare the compressor for use, proceed as follows:

- a. Remove transit case from shipping carton.
- b. Depress pressure relief valve on transit case on bottom section, release latches and remove transit cover.
- c. Attach appropriate length of interconnecting hose from compressor to Operating and Treatment Unit.
- d. Connect 115/230 volt power cable to appropriate power source.

2.4 OPERATIONAL CHECKOUT

CAUTION; DO NOT RESTRICT AIR FLOW THROUGH AIR INTAKE SILENCERS.

To check out the compressor for proper operation, proceed as follows:

NOTE: Do not draw any air from the compressor during the operational checkout procedure.

- a. Set ON-OFF circuit breaker to ON. Compressor motor and dryer cooling fan will energize.
- b. Observe pressure gauge. Pressure should increase to 80 psi in approximately 40 seconds. Unloader valve should switch and compressor should vent to atmosphere. Cooling fan will continue to run.
- c. Pressure should decrease to 60 psi in approximately 31 seconds. During this time a hissing sound should be heard indicating purged air in regeneration system is operating properly.
- d. When pressure decreases to 60 psi unloader valve should switch and compressor should pump for approximately 8 seconds while pressure again increases to 80 psi.
- e. At 80 psi, compressor vents to atmosphere and cycle should repeat (steps c and d).
- f. Check color of dryness indicator. If "blue", compressor is ready for operation. if not "blue", drying system should be regenerated before using compressor (paragraph 5-12).
- g. Rotate four transit cover supports. Place transit case cover on supports. (Refer to Figure 2-1.)

COMPRESSOR SETUP FOR OPERATION

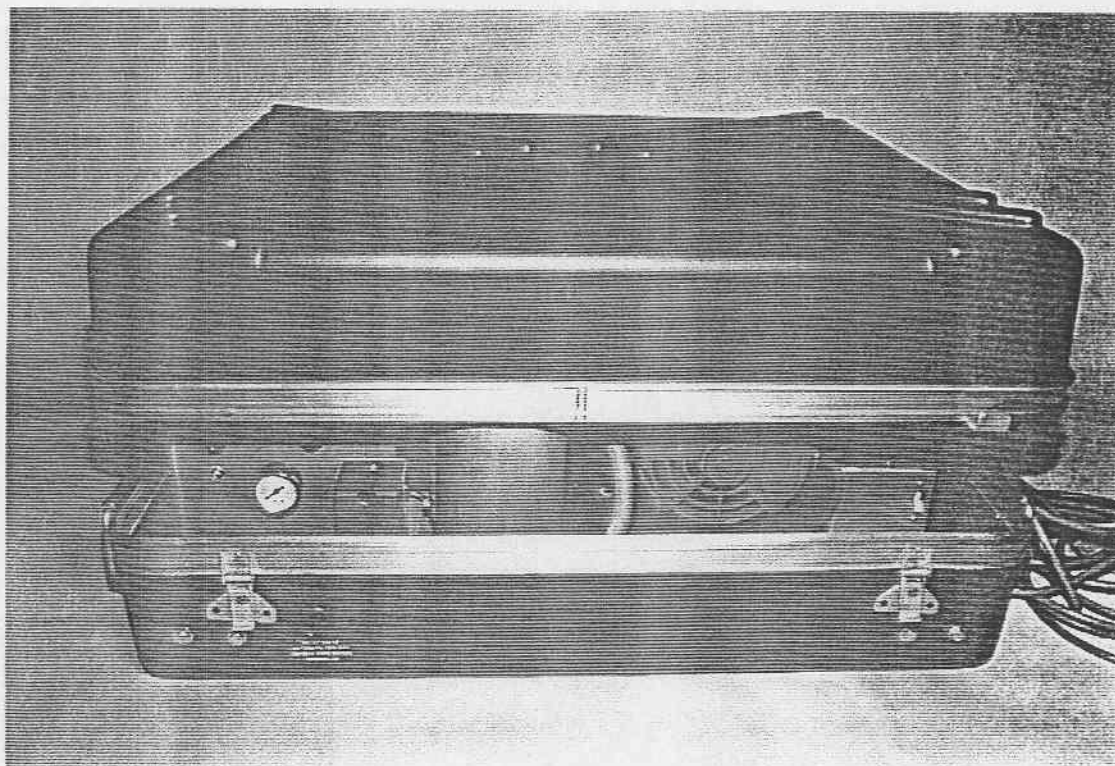


FIGURE 2-1

SECTION III

THEORY OF OPERATION

3-1 GENERAL

The operation of the compressor consists of two cycles, the pumping cycle and the purging cycle. During the pumping cycle, intake air is compressed, cooled, directed through a drying chamber and passes into a storage tank. In the drying chamber, a desiccant removes any water vapor. When the pressure in the storage tank reaches 80 psi, the compressor idles and the purging cycle begins. During the purging cycle, a portion of the dry compressed air in the storage tank is bled back through the drying chamber. This expanded dry air re-absorbs any moisture from the desiccant and carries it out into the atmosphere. When the pressure in the storage tank decreases to 60 psi the compressor unloader valve switches and the pumping cycle begins. These two cycles continue to automatically take place during operation of the compressor. Throughout both cycles, the cooling coil fan runs continuously and the dry compressed air in the storage tank is supplied to the Dental Operating and Treatment Unit. the following paragraphs explain these cycles in detail.

3-2 PUMPING CYCLE (Figure 3-1)

Initially, with no pressure in the storage tank the pressure switch contacts are closed. When the circuit breaker is set to ON, both the compressor and the cooling coil fan motor start. Compressed air from the compressor is directed through the cooling coil, the drying chamber, and the flow control valve into the storage tank. As mentioned above, the drying chamber contains a desiccant to remove water vapor from the air. The flow control valve contains a check valve to allow compressed air to enter the storage tank. The pressure gauge on the storage tank indicates the internal air pressure within the tank. the dryness indicator indicates the presence or absence of moisture in the stored compressed air by its color (blue for dry, pink for wet). when the storage tank pressure reaches 80 psi, the pressure switch opens and reverses the unloader valve, venting the compressor and drying chamber to the atmosphere. This ends the pumping cycle, and the purging cycle automatically begins.

3-3 PURGING CYCLE (Figure 3-2)

With the unloader valve reversed and the drying chamber vented to the atmosphere, dry compressed air in the storage tank passes through a metering orifice in the flow control valve where it expands at a controlled rate. this large volume of dry expanded air passes through the drying chamber, where it re-absorbs moisture from the desiccant, and releases it into the atmosphere. When the pressure in the storage tank decreases to 60 psi, the pressure switch closes and the pumping cycle again begins. These two cycles repeat as long as the compressor is in operation.

PUMPING CYCLE SCHEMATIC DIAGRAM

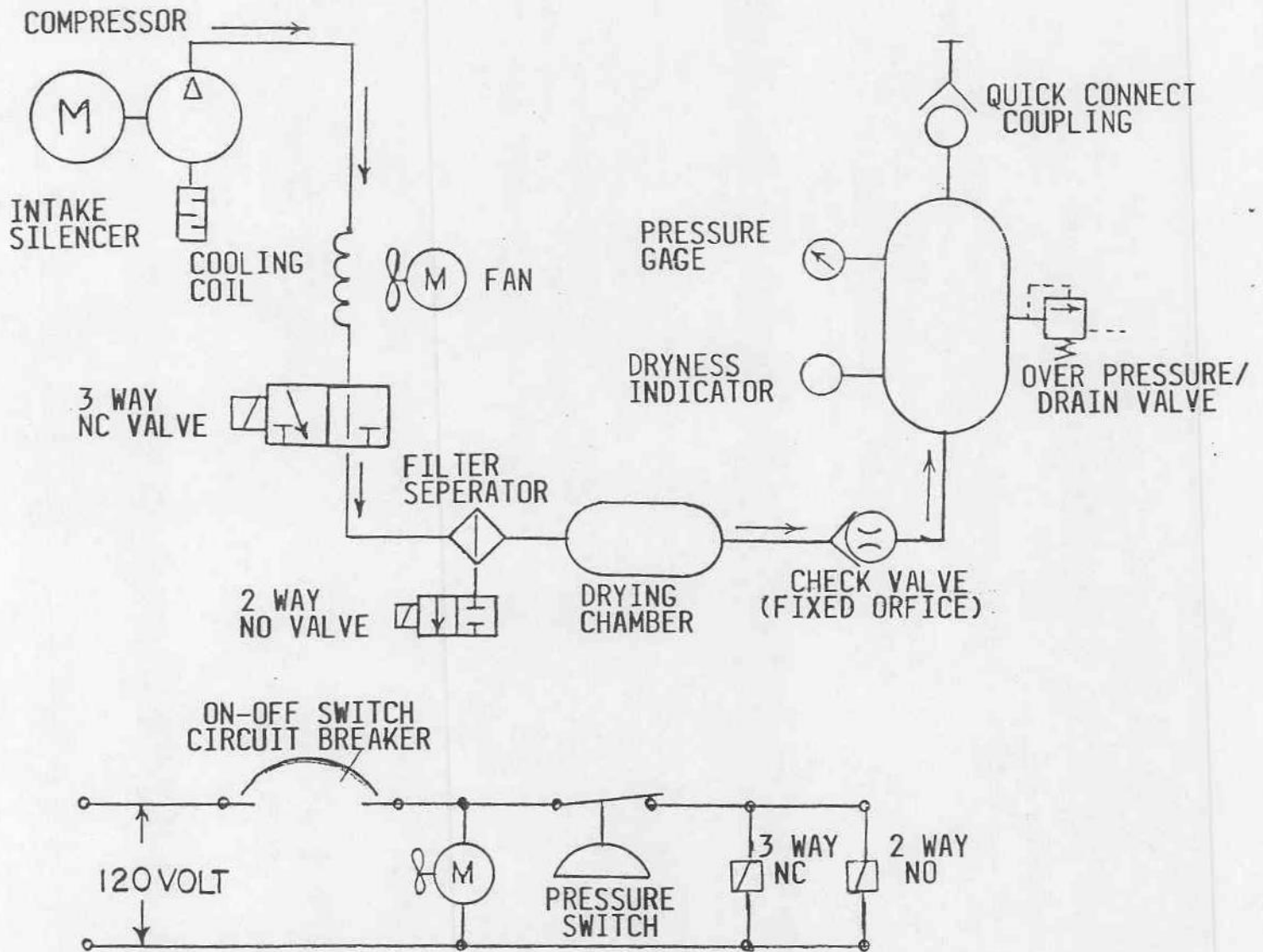


FIGURE 3-1

PURGING CYCLE SCHEMATIC DIAGRAM

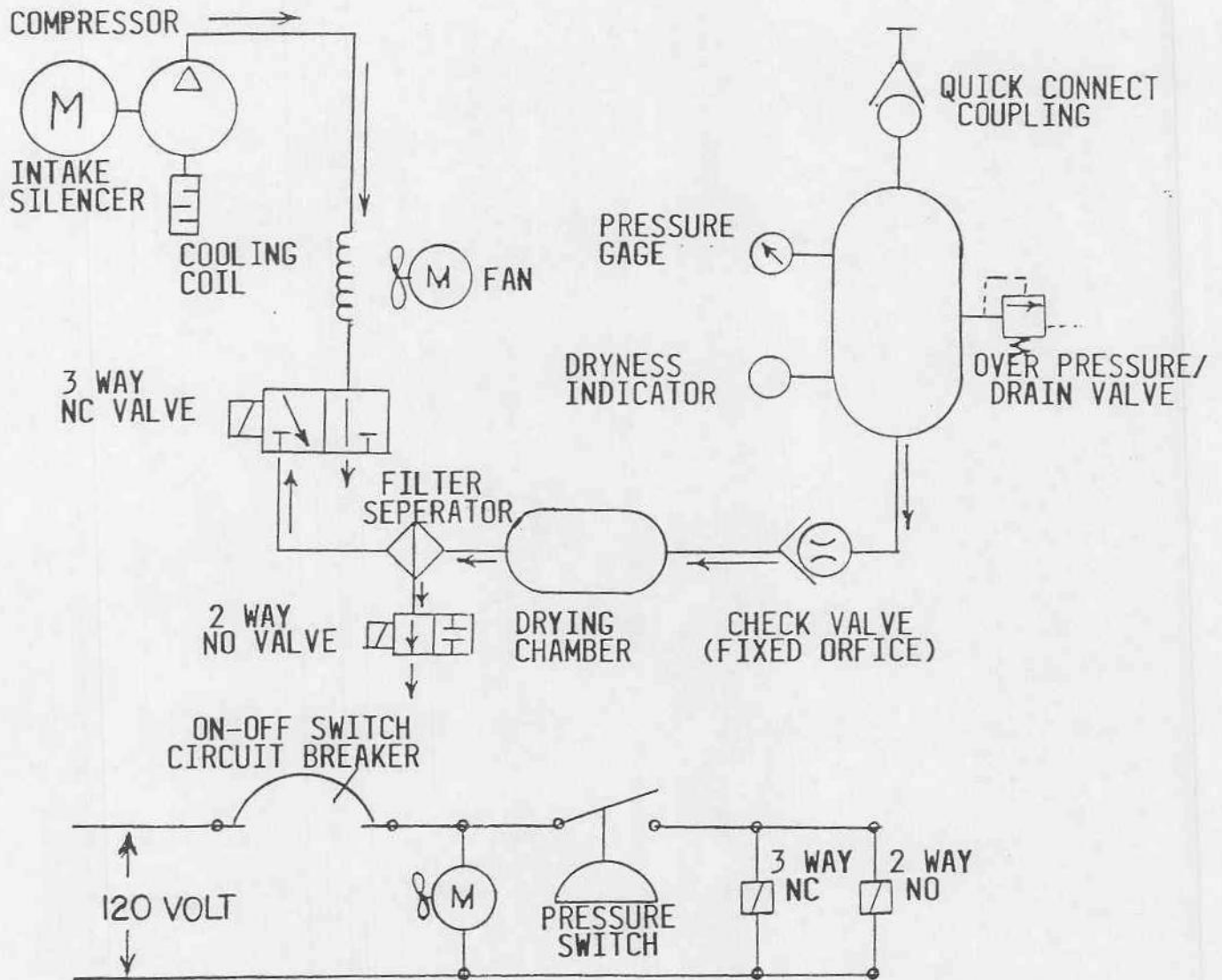


FIGURE 3-2

SECTION IV
OPERATING INSTRUCTIONS

4-1 OPERATOR'S CONTROLS AND INDICATORS

TABLE 4-1

INDEX	NAME	USE
1	Pressure Relief/ Drain Valve	Removing water and/or air from storage tank, also safety pressure relief valve.
2	Dryness Indicator	Indicates presence of moisture in air. (Blue is dry-Pink is wet)
3	Pressure Gauge	Indicates pressure of air in storage tank.
4	ON-OFF Circuit Breaker	Power switch and protective device for compressor motor.
5	Swivel Arm	Supports transit case cover above compressor during normal operation.
6	Compressor	Compress air for use by medical personnel.
7	Storage Tank	Stores dry compressed air.
8	Dryer	Removes moisture from compressed air prior to storage in the storage tank.
9	Cord	Supplies electricity to operate the compressor
10	Pressure Switch	Maintains a minimum of 60 psig and a maximum of 80 psig of air in the storage tank.
11	Case	Provides a housing for the compressor.
12	Quick Disconnect	Connection for air supply hose
4-2	OPERATING PROCEDURES	

Prior to operating the compressor, perform the operational checkout procedures given in Paragraph 2-4. The actual operating procedures of the compressor will operate to supply the required air. There are no operating adjustments associated with normal operation.

OPERATOR'S CONTROLS AND INDICATORS

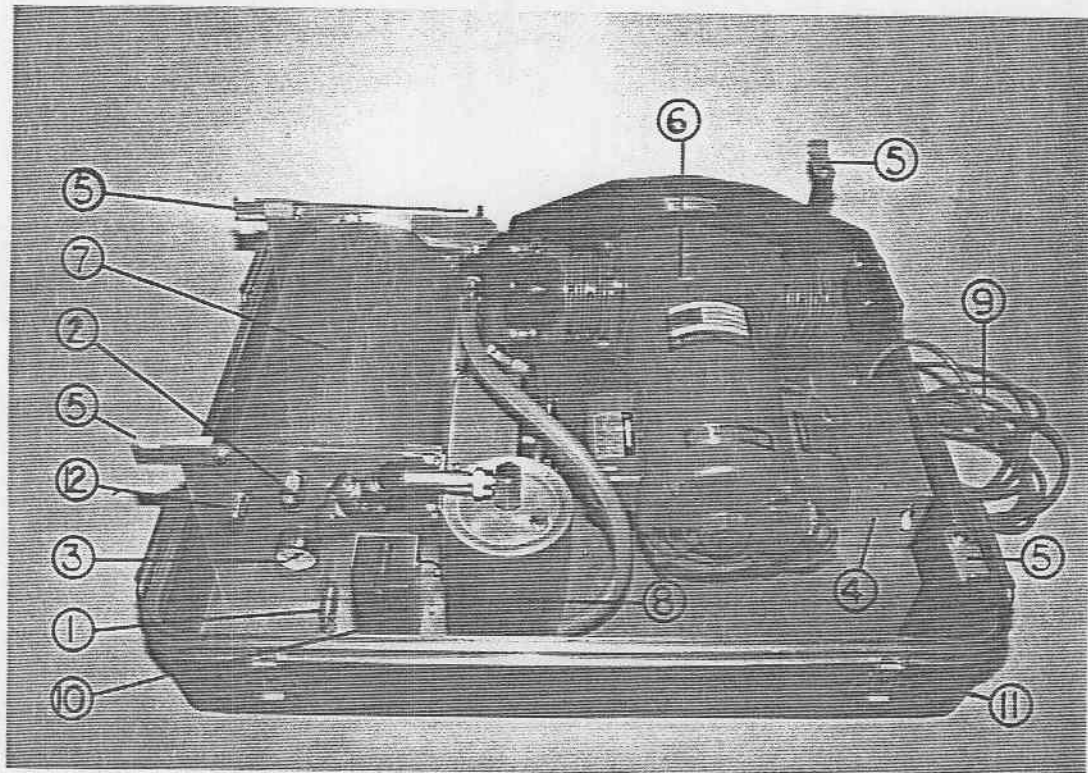


FIGURE 4-1

4-3 INTERMITTENT OPERATION

If compressed air is not to be drawn from the compressor for any period of time, set the ON-Off circuit breaker to OFF. In high humidity conditions, refer to Paragraph 5-12.

4-4 RESTARTING

To restart the compressor, set the circuit breaker to ON.

4-5 NORMAL LOAD

The recommended maximum operating load under normal circumstances is 6.0 cfm. (Refer to Table 4-2 for the load factors of various dental instruments.) The normal recommended load is equivalent to two complete units.

4-6 EXPEDIENT LOAD

The compressor unit has the capacity of providing air for two dental units operating normally or four units operating under emergency conditions.

NOTE: If operation in an emergency situation is necessary, the control block in the Dental Operating and Treatment Unit may have to be adjusted. This will permit higher pressure to be delivered to the handpieces in order to insure their peak efficiency when four systems are operating simultaneously. After use in an expedient situation, check dryness indicator and, if not blue, refer to Paragraph 5-12.

TABLE 4-2 LOAD FACTORS

SYSTEM	SCFM
Oral Evacuator	2.5
Saliva Ejector	0.5
High-speed Handpiece	1.3

4-7 TURN-OFF PROCEDURE

To turn off the compressor at the end of each day's use, proceed as follows:

- Set circuit breaker to OFF.
- Compressor will automatically drain.

NOTE: If any water is drained from the storage tank, the compressor is being overloaded. Check dryness indicator and, if not blue, refer to Paragraph 5-12.

SECTION V

MAINTENANCE INSTRUCTIONS

5-1 GENERAL

This section contains maintenance instructions for the compressor. If replacement parts are required for any of the maintenance procedures detailed in the following paragraphs, refer to Section VII, Parts List.

5-2 CLEANING

Any accumulation of dust and dirt should be periodically removed from the compressor. Particular attention should be given to the intake silencers. In extreme dusty conditions replace intake silencer filter elements daily. They can be cleaned by unscrewing filter canister from the compressor. Remove filter element from canister, clean with soap and water. Be sure filter elements are dry before replacing.

5-3 INSPECTION

Visually inspect the compressor for any obviously damaged hoses, tubes, cables or other items. Repair or replace as required.

5-4 PERFORMANCE VERIFICATION

The operational checkout procedure given in Paragraph 2-4 should be performed daily to verify proper function of the compressor.

5-5 TROUBLESHOOTING

Table 5-1 gives the probable causes for any abnormal indications that may be obtained during operation of the compressor, as well as the corrective action to be taken.

TABLE 5-1 COMPRESSOR TROUBLESHOOTING

PROBLEM	CHECK THE FOLLOWING:
Motor Will Not Start	Power failure Main disconnect off Overload device(s) tripped Defective switch Unusually low voltage

WARNING!! IN DUSTY CONDITIONS REPLACE INTAKE SILENCERS (FIG.7-1, PT NO. 29) DAILY. REPLACE FILTERS (FIG 7-1, PT NO. 14) EVERY 250 HOURS OF OPERATION.

TROUBLE SHOOTING GUIDE
(CONTINUED)

PROBLEM	CHECK THE FOLLOWING:
Motor Overheating	Improper Voltage Pressure switch set too high Ambient temperature too high
High System Pressure	Faulty pressure switch Pressure switch set too high Faulty relief valve Plumbing restrictions
No or Low Air Flow	Blocked air intake Dirty air intake filter Broken valve Worn or broken piston rings Leaks in system
Low Discharge Pressure	Blocked air intake Dirty air intake filter Worn piston rings Leaks in system Excessive system demand Faulty pressure switches
Overheated Compressor	Blocked shroud discharge Dirty air intake filter High discharge pressure Loose blower wheel
Excessive Vibration	Broken vibration isolators No vibration isolators Broken Valve
Unusual Noises	Damaged bearings Worn piston rings and/or skirts Broken valves Loose blower wheel Damaged blower baffle

5-6 REMOVAL

The following paragraphs contain removal procedures for those units of the compressor that are not obvious from visual inspection.

5-7 REMOVAL OF COMPRESSOR ASSEMBLY FROM TRANSIT CASE. To remove the compressor assembly from the transit case, refer to Figure 7-1 and proceed as follows:

- a. Remove nuts, lockwashers, and flat washer from bolts securing compressor base plate to transit case bottom.
- b. Lift compressor assembly (mounted on base plate) from transit case bottom.

NOTE: The bolts extending through the lower transit case have plastic washers under the heads. Be sure they are in place when reassembling to assure waterproof integrity.

5.8 REMOVAL OF DRYER ASSEMBLY AND DESICCANT REPLACEMENT

- a. Disconnect rubber hose at valve assembly.
- b. Remove locknut at top of drying chamber.
- c. Remove two screws from bracket.
- d. Remove drain plug from top of assembly
- e. Dump desiccant into container.
- f. Replace desiccant.
- g. Re-assemble dryer assembly.

5-9 ACCESS TO CIRCUIT BREAKER

- a. Remove screws.
- b. Lift cover from housing.

5-10 REMOVAL OF MOTOR AND COMPRESSOR ASSEMBLY. To remove the motor and compressor assembly, refer to Figure 7-1 and proceed as follows:

- a. Disconnect metal tube between cooling coil and compressor head at compressor.
- b. Disconnect cable from circuit breaker to compressor.
- c. Remove four nuts, lockwashers, and washers from bolts that secure motor and compressor assembly to base plate.
- d. Lift motor and compressor assembly from base plate.

5-11 SERVICE PROCEDURES. Detailed service procedures are contained in pages 1-17 of Thomas Publication RB0007.

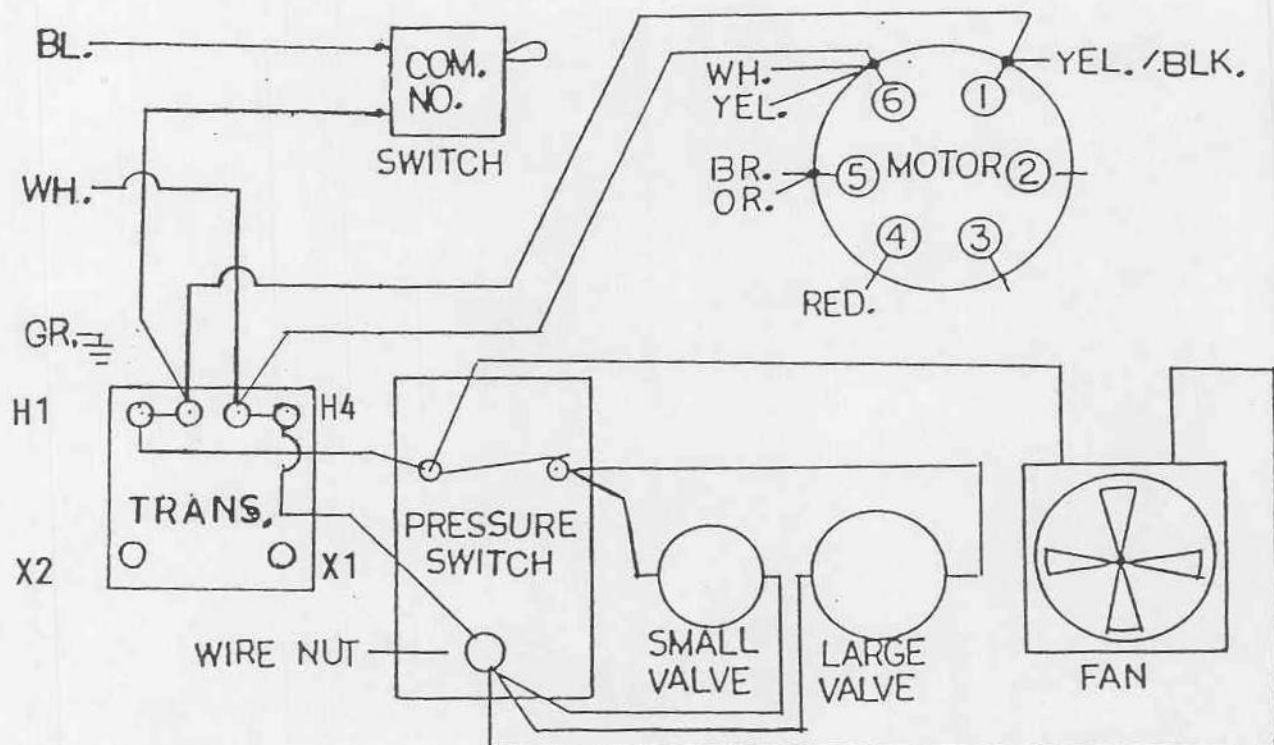
5-12 DRYNESS INDICATOR. If the dryness indicator is not blue, the drying chamber should be regenerated as follows:

a. If the dryness indicator is pink, allow the compressor to run for approximately three hours without drawing any air from the storage tank. If after that time the dryness indicator does not start to turn blue, refer to Paragraph b below. If the dryness indicator does start to turn blue, allow the compressor to continue to run until it is completely blue.

b. If the dryness indicator is white, or does not start to turn blue as outlined in Paragraph a above, drain storage tank and allow the compressor to run for five to seven nights. If after this time the dryness indicator does not turn blue, replace the dryness indicator disc. If the replacement disc does not remain blue replace the desiccant.

c. In extreme humid conditions (85% to 100% RH) when using compressor to operate two or more dental units desiccant may saturate with moisture. This is a normal condition when compressor cannot cycle to regenerate desiccant. If this condition occurs run the compressor for three hours without using any air from unit to allow desiccant to regenerate.

COMPRESSOR WIRE DIAGRAM 115 VAC 60 CYCLE

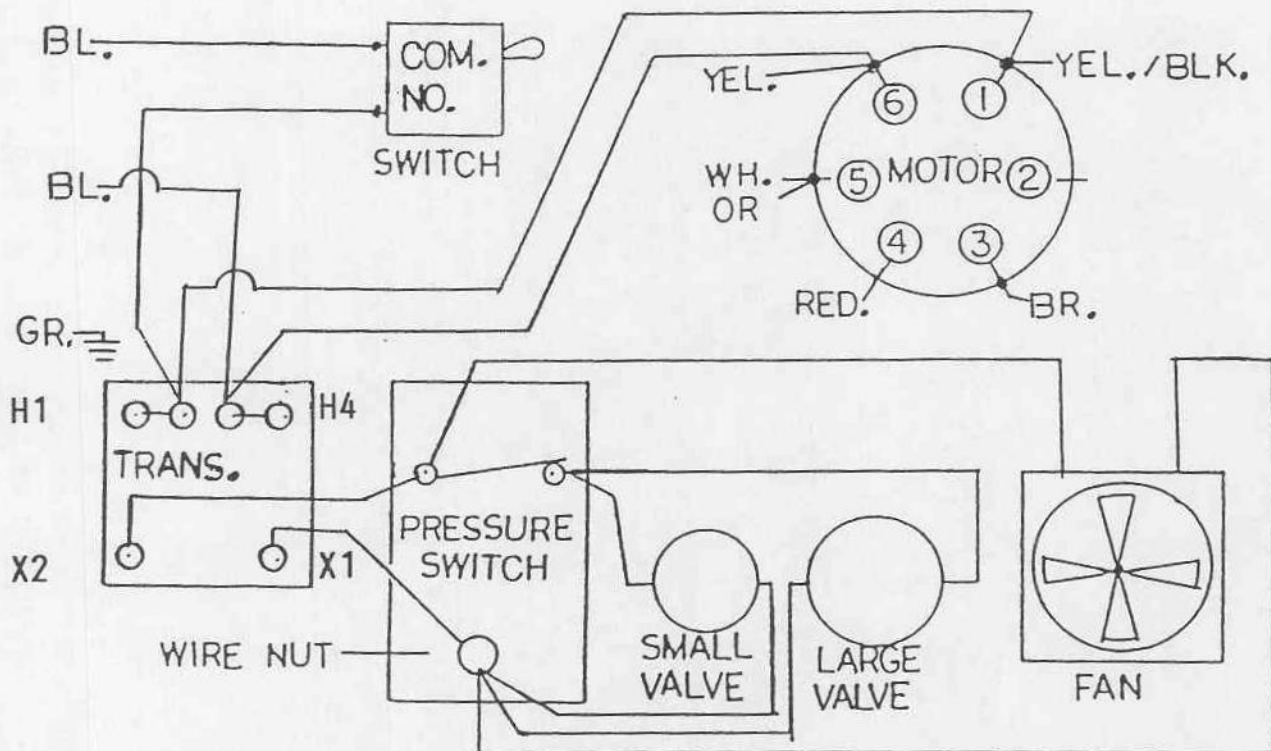


TO CHANGE FROM 230 VOLTS TO 115 VOLTS

- Motor -- Terminal # 1--Do not change
 Terminal # 3--Move Brown Wire to Terminal # 5
 Terminal # 4--Do not change
 Terminal # 5--Move White Wire to Terminal # 6
- Transformer -- Move Wire from X1 to H4
 Move Wire from X2 to H1

FIGURE 5-1

COMPRESSOR WIRING DIAGRAM 230 VAC 50 CYCLE



TO CHANGE FROM 115 VOLTS TO 230 VOLTS

MOTOR -- TERMINAL # 1--Do not change
 TERMINAL # 4--Do not change
 TERMINAL # 5--Move Brown Wire to Terminal # 3
 TERMINAL # 6--Move White Wire to Terminal # 5

TRANSFORMER -- Move Wire from H4 to X1
 Move Wire from H1 to X2

FIGURE 5-2

SECTION VI

PREPARATION FOR RESHIPMENT

6-1 GENERAL

To prepare the compressor for reshipment, proceed as follows:

- a. Perform the turn-off procedure given in Paragraph 4-7.
- b. Disconnect the interconnecting hoses between the compressor and the Dental Operating and Treatment Unit.
- c. Disconnect the power cable from the power source.
- d. Carefully wrap the interconnecting air hose and power cable into the transit case.
- e. Place transit case cover on the unit and secure all latches.

6-2 RESHIPMENT

The transit case should be placed into a suitable shipping carton for additional protection during transit.

SECTION VII
PARTS LIST
COMPRESSOR ASSEMBLY

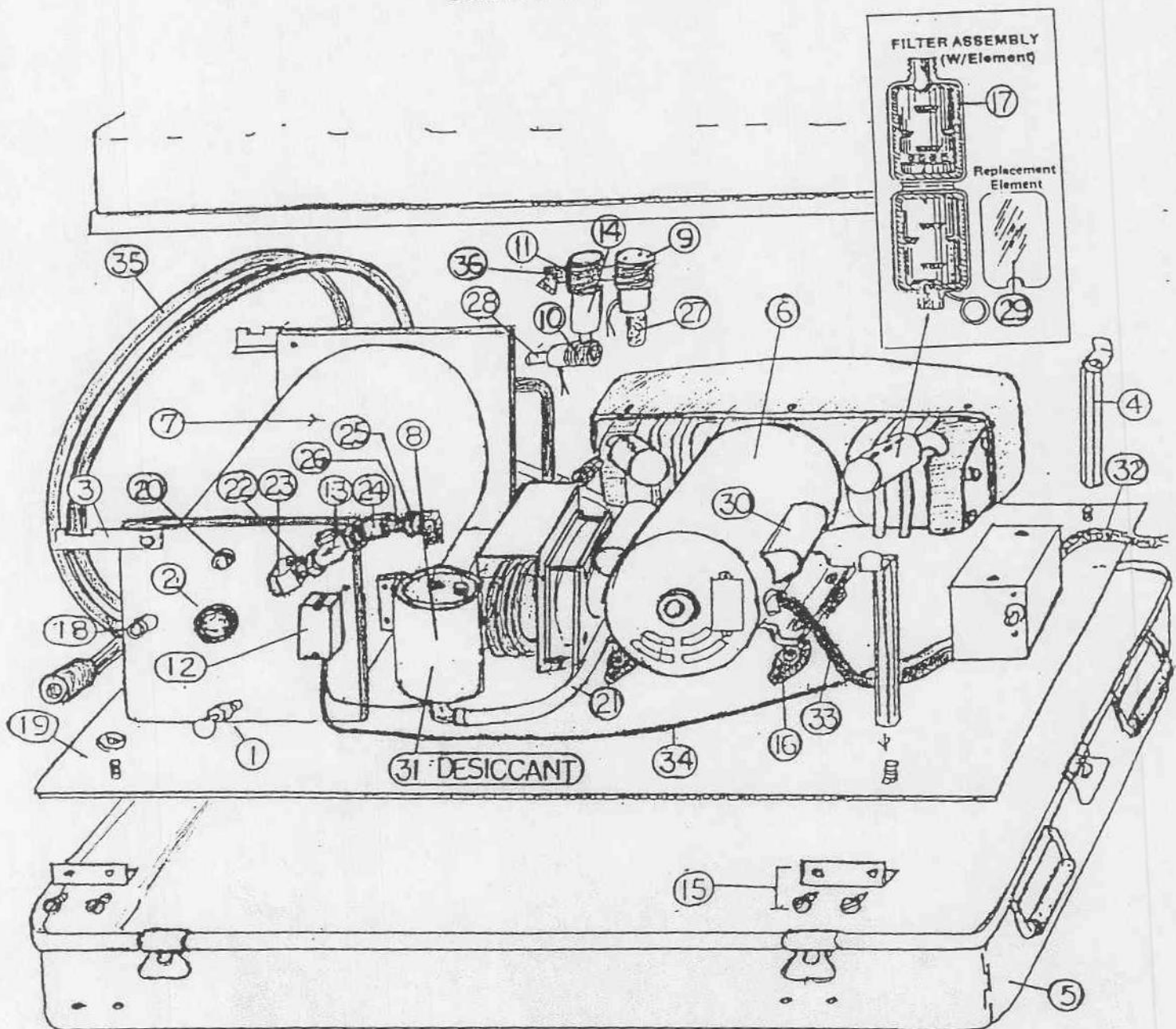


FIGURE 7-1

Table 7-1. Replacement Parts List

COMPRESSOR ASSEMBLY

Fig No.	Index No	Part No	Description	Qty
7-1	1	PAC6.7-001	Pressure Relief/Drain Valve	1
	2	PAC6.7-002	Pressure Gage	1
	3	PAC6.7-003	Lid Support	2
	4	PAC6.7-004	Swivel Arm Assembly	2
	5	PAC6.7-005	Case	1
	6	PAC6.7-006	Compressor Assembly	1
	7	PAC6.7-007	Tank	1
	8	PAC6.7-008	Drying Chamber	1
	9	PAC6.7-009	3-Way Valve	1
	10	PAC6.7-010	2-Way Valve	1
	11	PAC6.7-011	Water Separator	1
	12	PAC6.7-012	Pressure Switch	1
	13	PAC6.7-013	Check Valve	1
	14	PAC6.7-014	Water Separator Element	1
	15	PAC6.7-015	Support Bracket Assembly	4
	16	PAC6.7-016	Spacer Assembly	4
	17	PAC6.7-017	Intake Silencers	2
	18	PAC6.7-018	Quick Disconnect Coupling	1
	19	PAC6.7-019	Base Plate	1
	20	PAC6.7-020	Dryness Indicator	1
	21	PAC6.7-021	Connecting Hose	1
	22	PAC6.7-022	3/8 Close Nipple	1
	23	PAC6.7-023	3/8 Street L	1
	24	PAC6.7-024	3/8 45 degree	1
	25	PAC6.7-025	3/8 Street Swivel	1
	26	PAC6.7-026	3/8 x 3 Nipple	1
	27	PAC6.7-027	1/4 Muffler	1
	28	PAC6.7-028	1/8 Muffler	1
	29	PAC6.7-029	Replacement Filter Elements	2
	30	PAC6.7-030	Capacitor	2
	31	PAC6.7-031	DESICCANT (NOT SHOWN)	1
	32	PAC6.7-032	Service Cord Set	1
	33	PAC6.7-033	Cord Set from Terminal Block to Motor	1
	34	PAC6.7-034	Cord Set from Terminal Block to Pressure Switch	1
	35	PAC6.7-035	Air Hose	1
	36	PAC6.7-036	Filter	1
	37	PAC6.7-037	Replacement Foam Kit (Not Shown)	1

COOLING COIL ASSEMBLY

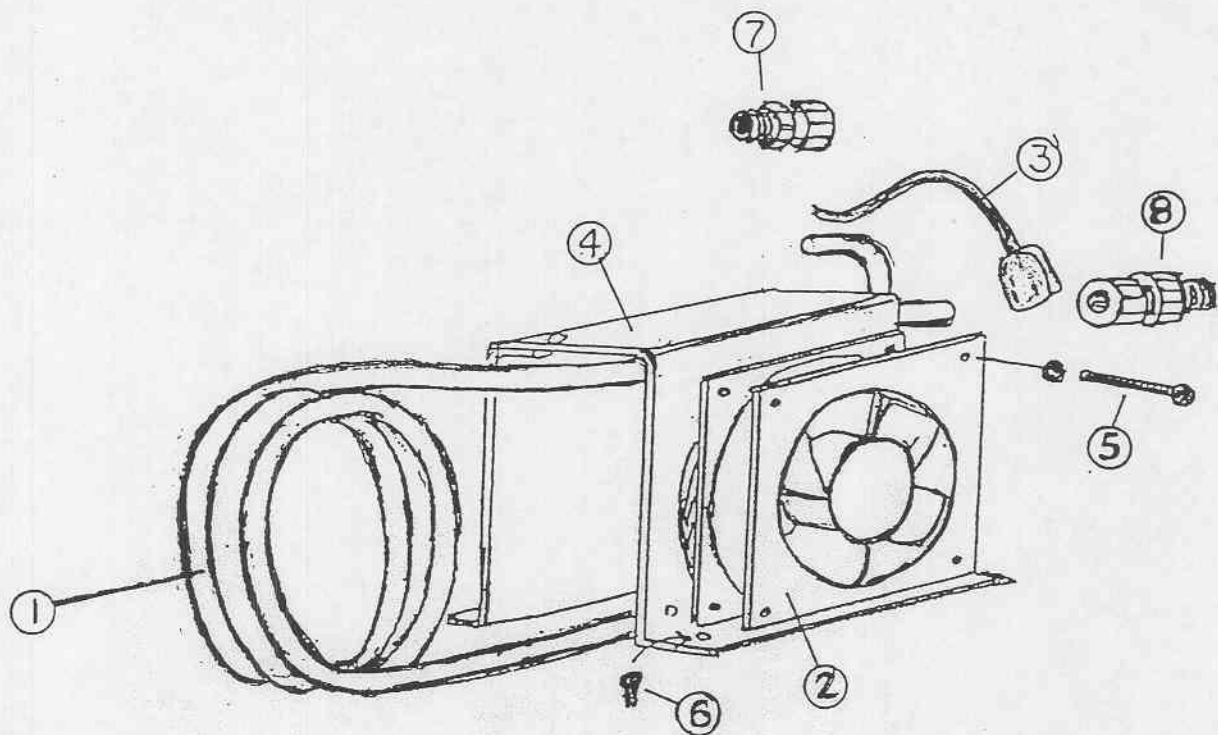


FIGURE 7-2

CIRCUIT BREAKER ASSEMBLY

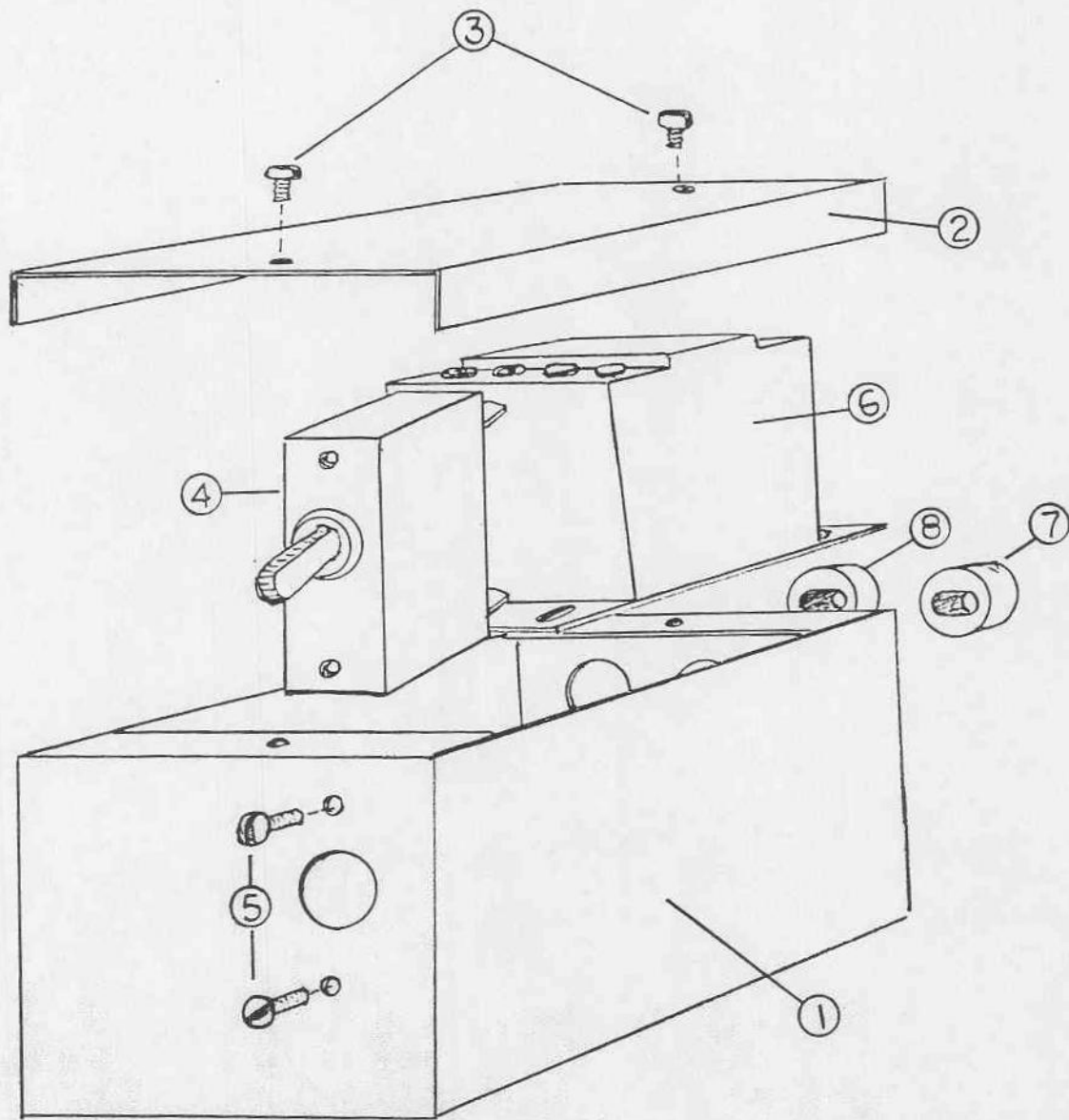


FIGURE 7-3

TABLE 7-2. Replacement Parts List

COIL ASSEMBLY

Fig No.	Index No	Part No	Description	Qty
7-2	1	PAC6.7-101	Tube Assembly	1
	2	PAC6.7-102	Fan	1
	3	PAC6.7-103	Cord Set	1
	4	PAC6.7-104	Housing	1
	5	PAC6.7-105	Fan Mounting Screws	4
	6	PAC6.7-106	Housing Mounting Screws	4
	7	PAC6.7-107	3/8x1/4 Straight Compression Fittings	1
	8	PAC6.7-108	3/8x3/8 Straight Compression Fitting	1

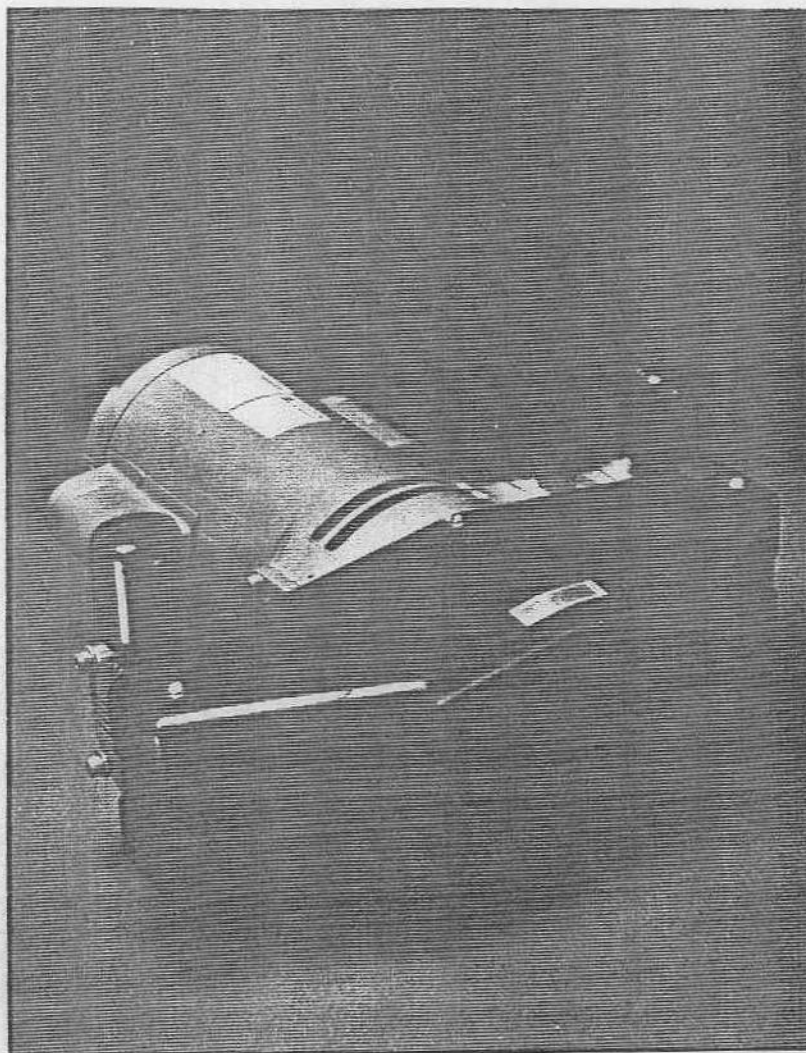
CIRCUIT BREAKER ASSEMBLY

7-3	1	PAC6.7-201	Housing	1
	2	PAC6.7-202	Housing Cover	1
	3	PAC6.7-203	Housing Cover Screws	2
	4	PAC6.7-204	Circuit Breaker	1
	5	PAC6.7-205	Circuit Breaker Mounting Screw	2
	6	PAC6.7-206	Transformer	1
	7	PAC6.7-207	Wire Grommet	1
	8	PAC6.7-208	Strain Relief Bushing	1

HP SERIES

PISTON AIR PRODUCTS

OWNERS MANUAL / PARTS LIST



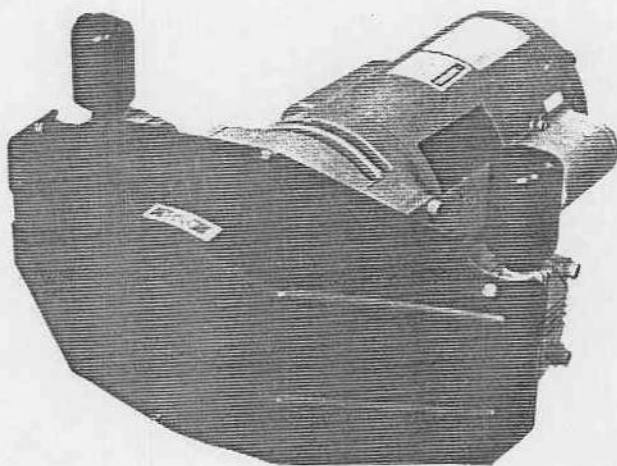
INTRODUCTION

Pneumotive HP products are air cooled, two cylinder, positive displacement air compressor or vacuum pump units mounted directly on the output shaft of an electric motor, making an integral motor-pump combination.

It is an oil-less design employing Teflon® (P.T.F.E. Compound) piston rings and skirts, and pre-lubricated, sealed-for-life bearings which require no further lubrication.

HP models are supplied as standard with compressor safety relief valve, check valve, 50 micron intake air filters, mounting sub-base and vibration isolator mounting kit.

NOTE: This manual covers both air compressor and vacuum pump models, therefore, the terms "unit," "machine" or "product" are used to describe applications pertaining to all models.



MODELS

1 h.p. = *HP-1000
 *HP-1050
 *HP-100V

1½ h.p. = *HP-1500
 *HP-1550

WARNING:

1. USE OF THIS PRODUCT IN OR NEAR EXPLOSIVE ATMOSPHERES, OR FOR PUMPING MIXTURES OTHER THAN ATMOSPHERIC AIR MAY CAUSE AN EXPLOSION OR FIRE, RESULTING IN PERSONAL INJURY OR DEATH!
2. Pneumotive offers oil-less air compressors which provide clean, oil-less discharge air. However, OSHA specifications require all breathing-air systems to meet the standards as specified for "Type 1, Group D Air," as further defined in CGA Pamphlet G-7.1. THEREFORE, ALL COMPRESSED AIR BREATHING SYSTEMS MUST INCLUDE AIR FILTRATION EQUIPMENT FROM COMPRESSOR INTAKE TO FINAL RESPIRATOR DEVICE.

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SPECIFICATIONS

MODEL	HP-1000	HP-1050	HP-1500	HP-1550	HP-100V
Air Delivery @ '0' PSIG (CFM)	7.5	9.8	10.0	10.4	—
Air Delivery @ 50 PSIG (CFM)	4.8	5.8	7.0	7.5	—
Air Delivery @ 100 PSIG (CFM)	3.2	—	5.2	—	—
Air Delivery @ 125 PSIG (CFM)	2.7	—	4.4	—	—

Air Delivery @ '0' Hg. (CFM)	—	—	—	—	8.0
Air Delivery @ 5" Hg. (CFM)	—	—	—	—	6.4
Air Delivery @ 20" Hg. (CFM)	—	—	—	—	1.7

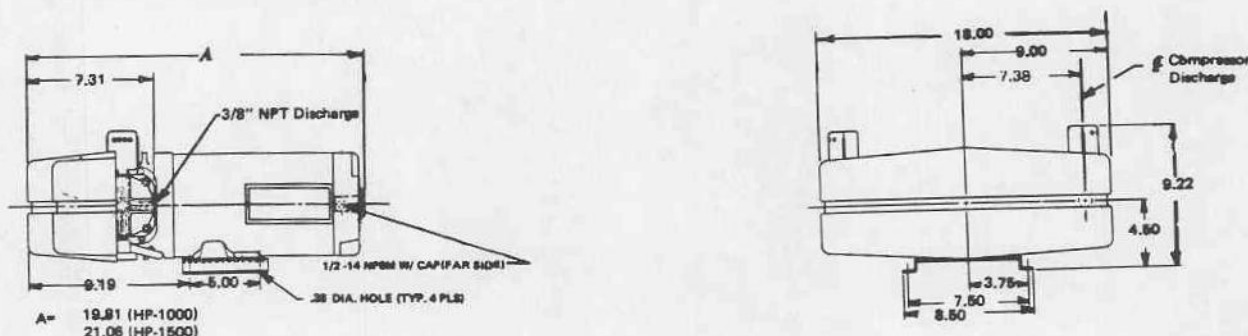
Maximum Cont. Duty (Press.)	125	50	125	50	—
Maximum Int. Duty (Press.)	145	50	145	50	—
Maximum Vac. ("Hg.)	—	—	—	—	27.5

Temp. Range (Ambient)	35 to 95 Degrees F				
Minimum Discharge Piping	3/8 Inch				
Motor Type	NEMA 56, Ball Bearing, Open Drip-Proof				
Horsepower	1.0	1.0	1.5	1.5	1.0
Starts Per Hour (Max.)	12 Starts/Hour Maximum				
Weight	70	70	75	75	70
Actual Shipping Weight	75	75	80	80	75

- * Ambient temperature should be between 35 and 95 degrees F. Higher temperatures can cause a breakdown in lubricating properties of the grease used in both unit and motor bearings. When this breakdown occurs, premature bearing failure can result. Extremely low temperatures will tend to thicken bearing grease during extended periods of off-time, causing starting problems when the motor is energized. Contact your local distributor or the factory if normal operating ambient temperatures are expected to be outside the recommended range.

** Refer to "Constant Speed Unloader", page 8.

**FIGURE 1 -
HP DIMENSIONS (IN INCHES)**



UNPACKING AND MOVING

HP air compressors and vacuum pumps are shipped mounted to a plywood shipping base and enclosed in a durable shipping carton. External band-straps secure the shipping carton during storage and transit.

To unpack the unit, begin by removing band-straps from the shipping carton and opening the top carton flaps. Next, remove the carton liner. Remove the inlet air filters (2), check valve and vibration isolators which are packaged separately and supplied with each compressor. Set these components aside for safe keeping as they will be required during installation. Lift the unit, complete with plywood shipping base, from the carton. Remove nuts and bolts securing unit to plywood base.

Should a mechanical lift be employed, use a lift device rated for at least 100 pounds. Always use a sling around the motor and base for lifting. **DO NOT USE SLOTS IN COMPRESSOR OR MOTOR ENDBELL AS ATTACHMENT POINTS FOR LIFT HOOKS.**

NOTE: Each Pneumotive HP Unit is thoroughly tested at factory to insure proper operation and rated performance. Since the units are shipped by private carrier, damage free delivery cannot be guaranteed. Therefore, it is imperative that it be carefully inspected upon receipt for possible damage. If damage has occurred, file claim with the carrier immediately.

INSTALLATION LOCATION

When choosing a location for installation certain factors should be considered.

Choose an area with a source of clean air, free of dust, dirt and corrosive vapors. Humidity should be as low as possible. Enough room should be provided around the unit to provide easy maintenance.

The location should be as close as possible to the area where the air is to be used to prevent unnecessary pressure losses in the supply line.

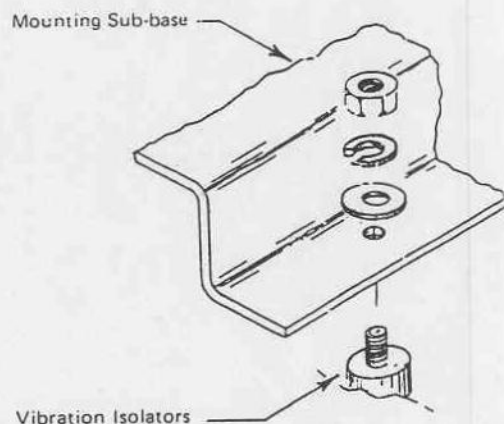
Ambient temperatures should be between 35 and 95 degrees F and the installation area should have adequate ventilation to prevent excessive heat build-up from either unit operation, or from heat generated by other mechanical equipment located nearby.

As with any piece of mechanical equipment, an air compressor or vacuum pump should be installed in an area which is not noise sensitive.

MOUNTING REQUIREMENTS

The mounting surface must provide adequate structural support for the weight of the product and the surface should be reasonably level. Vibration isolators supplied with each unit should first be secured to the intended mounting surface using the flatwashers, lockwashers and nuts provided with the isolators. Next, secure unit to top studs of vibration isolators as illustrated in Figure 2.

**FIGURE 2-
VIBRATION ISOLATOR INSTALLATION**



ELECTRICAL REQUIREMENTS

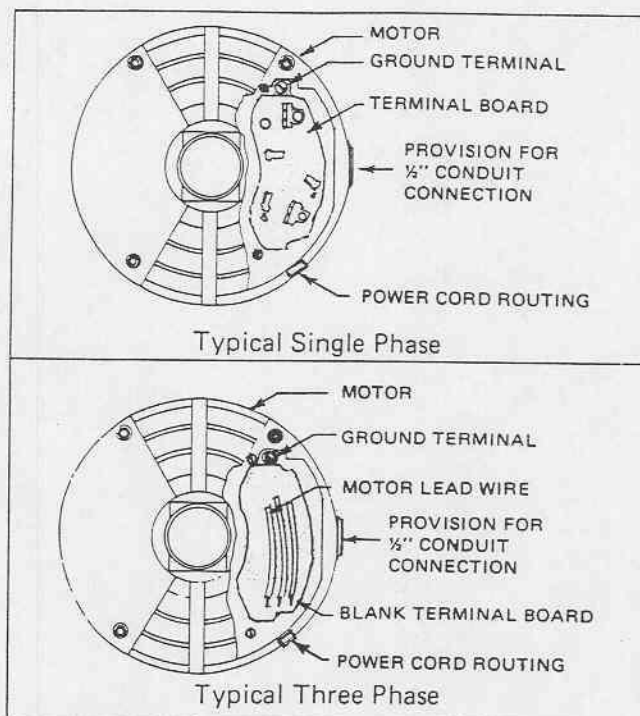
ALL ELECTRICAL CONNECTIONS SHOULD BE MADE BY A QUALIFIED ELECTRICIAN IN ACCORDANCE WITH ALL LOCAL AND NATIONAL CODES.

Power lead connections are to be made within the terminal box area located inside the rear motor endbell. Access to this terminal box area is gained by loosening the two cover plate screws and removing cover plate. See Figure 3. Single phase motors employ a phenolic terminal board with both quick connect and stud type wiring connectors. Three phase motors are equipped with pigtail motor leads suitable for power lead connections using field supplied wire nuts or other acceptable insulated splice connectors.

Always check motor wiring diagram located on inside surface of cover plate to insure that motor wiring properly matches the field power supply voltage. For three phase units, ALWAYS INSURE PROPER FIELD WIRING CONNECTION FOR DIRECTION OF ROTATION AS SPECIFIED ON THE UNIT.

BE SURE MOTOR IS PROPERLY GROUNDED.

FIGURE 3 - MOTOR CONNECTIONS



Single phase motors are equipped with an internal, automatic reset type thermal protector. Three phase motors require external overload protection. Magnetic motor starters which include overload protection devices (heaters) are recommended. Refer to electrical data chart below for recommended heater ratings.

The motor/compressor - vacuum pump is designed to operate within a $\pm 10\%$ range from rated voltage. This tolerance of $\pm 10\%$ will compensate for variations in supply voltage common to most electrical distribution systems. Excessive low or high voltage will cause an increase in running amperes and motor temperature which can significantly reduce motor life.

ELECTRICAL DATA TABLE

MODEL	H.P.	MOTOR VOLTAGE	PART NO.	SERVICE FACTOR AMPERES	RECOMMENDED HEATER* SIZE	START SIZE
HP-1000	1	115/230/60/1	M98708	16.0/8.0	B25/B11.5	NEMA 1
HP-1050		220/240/50/1	M98735	6.1	B8.20	NEMA 0
HP-100V		208/230/460/60/3	M98741	5.4/5.2/2.6	B7.7/B3.70	NEMA 00
		190/220/380/440/50/3	M98737	3.6/4.0/1.8/2.0	B5.5/B3.00	NEMA 00
		575/60/3	M98739	2.1	B3.00	NEMA 00
HP-1500	1.5	115/230/60/1	M98709	19.0/9.5	B28/B12.8	NEMA 1
HP-1550		220/240/50/1	M98736	8.8/8.6	B12.8	NEMA 0
		208/230/460/60/3	M98724	6.8/6.4/3.2	B9.10/B4.85	NEMA 00
		190/230/380/440/50/3	M98738	6.4/6.0/3.2/3.0	B9.10/B4.85	NEMA 00
		575/60/3	M98740	2.6	B3.70	NEMA 00

*Square D Company Ratings

INTAKE AIR SUPPLY AND FILTERS

For optimum product life, a source of clean, dry intake air is essential. Cooler intake air temperatures contribute to higher efficiency. Two intake filters are supplied as standard equipment.

Intake air filters should be cleaned every month by blowing compressed air through each filter element. Should the unit be subjected to unusually dirty conditions, the intake filters should be cleaned more frequently. Replace filter elements every six months.

Filters are threaded into an inlet port in each cylinder head. The filter element may be cleaned or replaced by removing the filter assembly from the cylinder head, sliding the attached snap ring over the threaded halves, then opening the filter casing and removing the element. Care should be taken to properly replace and align element in the filter casing prior to reinstallation.

RECEIVER REQUIREMENTS

Discharge air should be piped to a receiver sized to limit the number of machine starts to not more than 12 per hour.

The receiver should be placed as close as possible to the unit.

A teflon lined, steel braided, flexible hose must be used between the unit and hard piping to dampen vibrations that could cause failure of the piping and/or receiver. A discharge hose assembly meeting these requirements is available as an accessory item and is shown on Page 8.

WARNING: THE USE OF ASME CODED PRESSURE VESSELS AND ASME CODED RELIEF VALVES REQUIRED BY LOCAL, STATE AND/OR FEDERAL CODES.

All components and piping to the receiver should not be smaller than 3/8" NPT discharge from the unit.

A drain valve should be placed in the lowest point of the receiver to permit drainage of accumulated moisture. The receiver should be drained daily. Failure to remove accumulated moisture from the receiver will result in a loss of receiver capacity and will cause an increase in the number of starts-per-hour, causing unnecessary wear and/or premature failure. Automatic receiver drains are available as accessory items and are recommended.

If a refrigerant type air dryer is to be employed in the compressed air system, its location in respect to the compressor and air receiver must be considered. Installation of the dryer between compressor and receiver will typically require the use of a forced air, or water cooled, aftercooler to provide suitable inlet air temperatures to the dryer (refer to dryer manufacturer's recommendations regarding maximum allowable inlet air temperatures). In many cases, dryer installation downstream from the receiver will provide suitable inlet air temperatures to the dryer, thus eliminating the need for an aftercooler.

NOTE: The check valve provided with each HP Series Air Product is a 3/8" NPT, in-line, poppet type valve and should be installed in the system piping at least four feet downstream from the compressor discharge. This check valve has a 1/8" NPT unloader port located in the bottom of the valve body.

All distribution lines should offer minimum resistance to air flow. This can be accomplished by utilizing long radius elbows and pipe of sufficient size to minimize pressure drop between compressor and end point of use. Piping should be kept as short as possible with a minimum number of turns and should not be smaller than the discharge of the compressor.

Branch lines should be taken from the top of the main line; this aids in keeping moisture out of the branch lines. To facilitate draining of accumulated moisture from the distribution lines, piping should slope away from the receiver and should include drain traps at the lowest points. Lines should be drained daily.

ACCESSORIES

1. CONSTANT SPEED UNLOADER

Volume of air required by the pneumatic system as well as volume of the system's air receiver are major factors which determine how often a compressor will cycle on/off. For installations where system demand, and/or receiver size, produce compressor stop/start cycling in excess of 12 motor starts per hour, the compressor should be operated in a load/unload cycling mode. This load/unload cycling mode is commonly termed "constant speed operation," and it is used to prevent motor temperature build-up caused by excessive on/off cycling.

A constant speed unloader as shown in Figure 4 is available as an accessory item for installation in systems requiring load/unload compressor operation. This constant speed unloader is a pilot device featuring "lock-out" capability, thus making the device suitable for use in systems where both unloader (load/unload) and pressure switch (stop/start) control of compressor operation are desirable.

2. AUTOMATIC RECEIVER DRAIN

Shown in Figure 5 is an automatic receiver drain which eliminates manual draining of the receiver. This automatic drain is an accessory item and may be ordered as a kit which includes mounting bracket and hardware items required for installation.

The automatic tank drain uses a pressure differential actuation to expel moisture from the air receiver after each pumping cycle of the compressor. As a result, the accumulation of condensation in the tank is eliminated. A drain port is provided for periodic testing or flushing.

3. DISCHARGE HOSE ASSEMBLY

Figure 6 illustrates the 24" long, high temperature flexible hose available for isolation of the compressor from hard piping used in the air system.

FIGURE 4 - UNLOADER

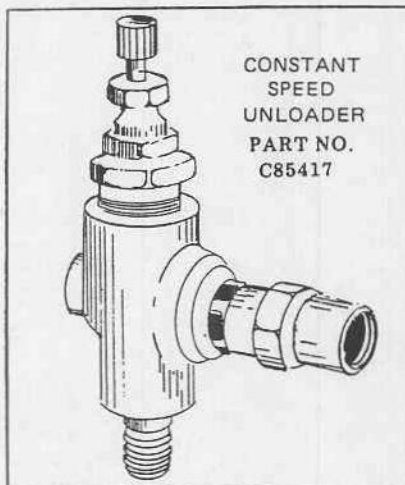


FIGURE 5 - AUTOMATIC DRAIN

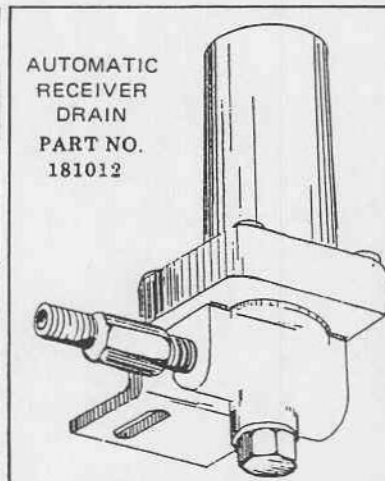
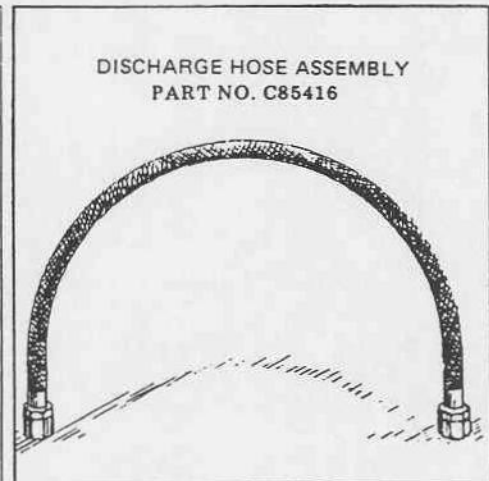


FIGURE 6 - DISCHARGE HOSE



START UP PROCEDURES

All Pneumotive products are thoroughly tested at the factory. To insure proper operation and rated performance, the following procedures and precautions must be applied at start up to prevent damage to the machine or the operator.

- Unit has been installed in a well ventilated area where:
Ambient temperature surrounding compressor is in the range of +35°F to +95°F.
Ambient air is free of dirt, sand, dust, etc.
- All intake filters are installed.
- The unit is securely mounted.
- Discharge piping is minimum 3/8" NPT, and a flexible hose connection has been employed to isolate the unit from hard piping used in the system.
- An ASME Code safety relief valve, rated at a pressure not exceeding the working pressure rating of the ASME Code air receiver, has been installed.
- The check valve is installed at the air receiver, or in the system piping at least four feet downstream from the compressor discharge.
- Unloader plumbing connections have been made to assure compressor does not start against system pressure load. (Refer to NOTE at bottom of Page 7.)
- Unit is free of any foreign items such as packing, rags, tools, clothing, etc.
- NO FLAMMABLE VAPORS ARE PRESENT.
- Field wiring connections to motor have been checked for proper match of power supply voltage to motor wiring. Refer to wiring diagram located on inside surface of motor terminal cover plate for correct motor lead connections on dual or tri-voltage motors.
- Three phase motor operation is controlled by a magnetic motor starter with thermal overload devices (heaters) installed.
- Correct rotation has been verified for three phase motor operation by "jogging" motor while observing rotation. PROPER ROTATION IS SPECIFIED ON THE PRODUCT AND IS ALWAYS CLOCKWISE WHEN FACING FRONT OF UNIT.
INCORRECT MOTOR ROTATION WILL CAUSE UNIT FAILURE!

If motor rotation is incorrect - IMMEDIATELY disconnect the main power source and reverse any two of the three line-to-motor lead connections.

SAFETY PRECAUTIONS

Rotating machinery and hot surfaces can cause injuries. Keep fingers, foreign objects and clothing free from rotating parts and do not touch hot surfaces.

Never attempt to service an operating compressor/vacuum pump.

Do not attempt to service the unit without first isolating it from system pressure and relieving back-pressure.

Be sure all the power to the unit has been disconnected before servicing. Thermal protector in single phase motors can automatically start motor when the device resets.

USE OF THIS PRODUCT IN OR NEAR EXPLOSIVE ATMOSPHERES, OR FOR PUMPING MIXTURES OTHER THAN ATMOSPHERIC AIR MAY CAUSE AN EXPLOSION OR FIRE, RESULTING IN PERSONAL INJURY OR DEATH!

Always install a relief valve between the compressor discharge and the first shut-off valve used in the system piping. This relief valve must prevent pressure from exceeding 145 PSIG, maximum.

Always keep the area around the unit clean.

Never operate the compressor at pressure in excess of 145 PSIG.

Never operate the unit without the cooling shroud as excessive temperatures will result.

Never enclose the unit in a box or enclosure other than a factory specified or supplied enclosure specifically designed for that model.

NEVER LUBRICATE PNEUMOTIVE HP SERIES COMPRESSORS OR VACUUM PUMPS — THEY ARE OIL-LESS!

TROUBLE SHOOTING GUIDE

PROBLEM

Motor Will Not Start

CHECK THE FOLLOWING:

- Power failure
- Main disconnect off
- Overload device(s) tripped
- Defective switch
- System already at pressure
- Unusually low voltage
- Compressor starting load too high

Frequent Motor Starts

- System undersized
- Water in the receiver
- Plumbing restrictions
- Leaks in system
- Defective pressure switch
- Improper pressure switch setting

**TROUBLE SHOOTING GUIDE
(CONTINUED)**

PROBLEM

CHECK THE FOLLOWING:

Motor Overheating

Improper voltage
Pressure switch set too high
Ambient temperature too high

Compressor starting load too high

High System Pressure

Faulty pressure switch
Pressure switch set too high
Faulty relief valve
Plumbing restrictions

No or Low Air Flow

Blocked air intake
Dirty air intake filter
Broken valve
Worn or broken piston rings
Leaks in system

Low Discharge Pressure

Blocked air intake
Dirty air intake filter
Worn piston rings
Leaks in system
Excessive system demand
Faulty pressure switches

Overheated Compressor/Vacuum Pump

Blocked shroud discharge
Dirty air intake filter
High discharge pressure
Loose blower wheel
Wrong motor rotation
Defective exhaust valve

Starting load too high

Excessive Vibration

Broken vibration isolators
No vibration isolators
Broken valve

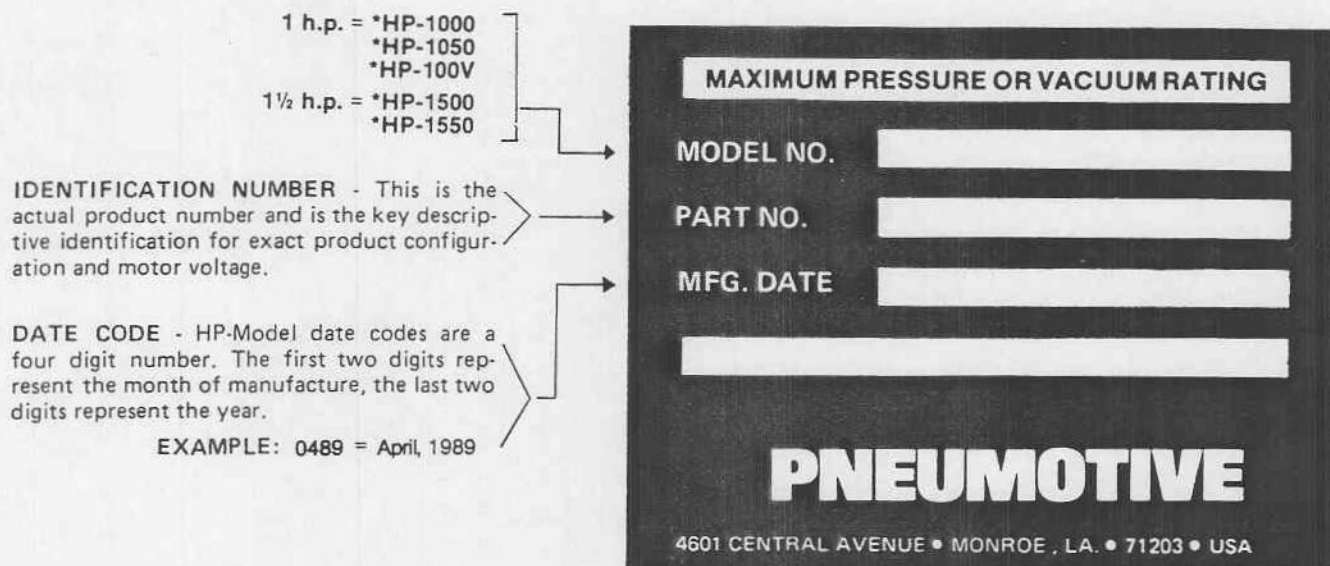
Unusual Noises

Damaged bearings
Worn piston rings and/or skirts
Broken valves
Loose blower wheel
Damaged blower baffle

GENERAL SERVICE INFORMATION

For parts and service on HP series products contact the nearest authorized Pneumotive distributor. Refer to Yellow Pages or contact the factory. To expedite appropriate service, be prepared to provide the unit model number, identification number, and manufacturing date code found on the unit nameplate. (The nameplate is located on the side of the unit motor.)

NAMEPLATE



*NOTE: Additional nomenclature following the basic model number refers to specific factory-fabricated tank assemblies and their respective electrical control options. See the HP product catalog for full tank assembly configurations.

To properly identify the various component parts utilized in the manufacture of HP units, always refer to the appropriate diagram, chart or listing as designated herein.

Figure 8 on page 14 depicts a representative exploded view of the HP air compressor illustrating the assembly relationship of component parts. Shown in Figures 9 & 10 on Page 15 are detailed exploded views of the unit valve assemblies. Note that component part descriptions as well as part numbers are presented. When making service parts inquiries, always use both part number and description as presented in this manual. Complete service kits may be selected as required from the listing found on Page 13.

SERVICE KITS FOR HP SERIES AIR COMPRESSORS

Listed below are the replacement components that are available for the repair of Pneumotive's Hp Series Air Compressors.

RING SERVICE KIT

<u>KIT NO.</u>	<u>MODEL NO.</u>	<u>DESCRIPTION</u>
C85408-P	HP-1000, 1050, 1500, 1550, 100V TA-7122, 7V2, 7052, 8122, 8052	C85150 PISTON SKIRT (4) C85204 PISTON RING EXPANDER (4) C85298 PISTON RING (4) C85403 COMPRESSION SLEEVE (2)

VALVE ASSEMBLY SERVICE KIT

<u>KIT NO.</u>	<u>MODEL NO.</u>	<u>DESCRIPTION</u>
C85407-P	HP-1000, 100V, 1050, 1500 TA-7122, 7V2, 7052, 8052, 8122	C85152 CYLINDER SLEEVE GASKET (2) C85153 CYLINDER HEAD GASKET (2) C85193 VALVE REED GASKET ASSEMBLY (2) C85213 VALVE PLATE (4) C85403 COMPRESSION SLEEVE (2)

MAJOR SERVICE KIT

<u>KIT NO.</u>	<u>MODEL NO.</u>	<u>DESCRIPTION</u>
C85409-P**	HP-1000, TA-7122	C85407-P VALVE SERVICE KIT C85127-P PISTON & ROD ASSEMBLY KIT C85408-P RING SERVICE KIT
C85410-P**	HP-100V, 1500 TA-7V2, 8122	C85407-P VALVE SERVICE KIT C85147-P PISTON & ROD ASSEMBLY KIT C85408-P RING SERVICE KIT
C85496-P**	HP-1050 TA-7052	C85407-P VALVE SERVICE KIT C85452-P PISTON & ROD ASSEMBLY KIT C85408-P RING SERVICE KIT
C85495-P**	HP-1550 TA-8052	C85494-P VALVE SERVICE KIT C85147-P PISTON & ROD ASSEMBLY KIT C85408-P RING SERVICE KIT

**NOTE: These kits service both cylinders.

COMPONENT LIFE OPERATING AT CONTINUOUS DUTY & MAXIMUM PRESSURE

Life of the rings and skirts are difficult to predict due to many conditions which directly influence wear. Some of these conditions may include ambient air temperature, air cleanliness, operating pressure, piston stroke on the particular model being utilized, duty cycle, maintenance of filters, etc.

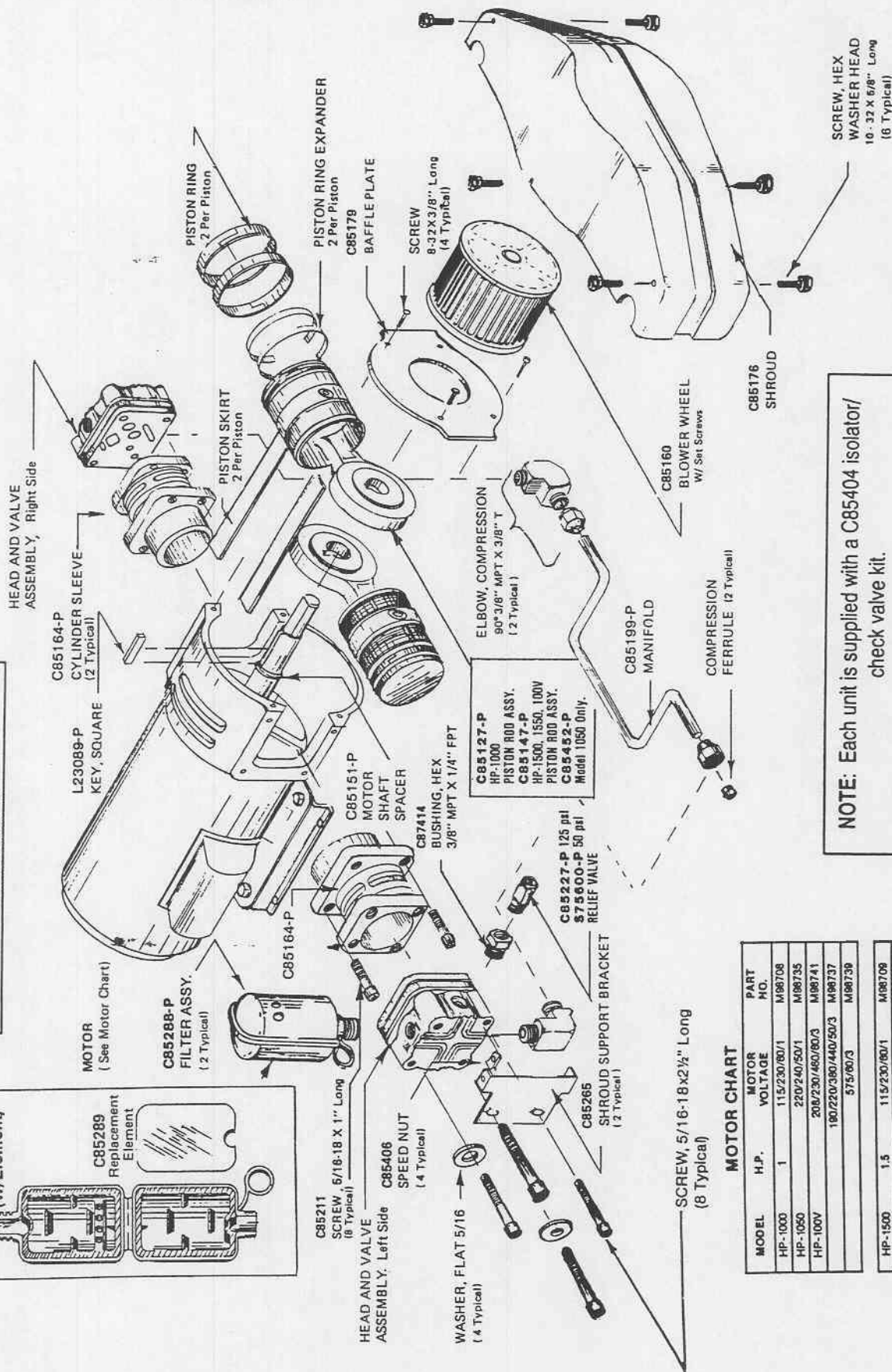
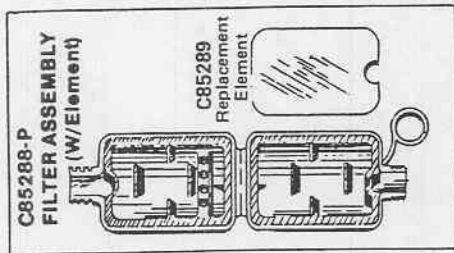
Because of these various factors it is appropriate to generalize on component wear life and choose some conservative estimates for most standard applications.

With these conditions in mind, we recommend for optimum performance, the following preventative maintenance schedule (optimum performance is based on only a 15--20% decrease in calculated performance).

RECOMMENDED MAINTENANCE FOR HP MODELS	HOURS	TIME
	Cont. Duty Maximum Pressure	Based on 33% Duty Cycle
Minor Service Kits, Piston Rings & Springs, Skirts, Etc.	6,000 Hours	2+ Years
Major Replacement Kit, Piston & Rod Assemblies	12,000 Hours	2+ Years

FIGURE 8- HP GENERAL ASSEMBLY

NOTE: PNEUMOTIVE DOES NOT RECOMMEND THE USE OF TEFLON TAPE OR OTHER SEALANTS TO BE USED WHEN INSTALLING INTAKE FILTER



NOTE: Each unit is supplied with a C85404 isolator/ check valve kit.

Pneumotive does not recommend hard mounting for HP series compressor. Isolators are strongly recommended for operation

MOTOR CHART

MODEL	H.P.	MOTOR VOLTAGE	PART NO.
HP-1000	1	115/230/60/1	M98708
HP-1050		220/240/50/1	M98735
HP-100V		208/230/460/60/3	M98741
		190/220/380/440/50/3	M98737
		575/60/3	M98739
HP-1500	1.5	115/230/60/1	M98709
HP-1550		220/240/50/1	M98736
		208/230/460/60/3	M98724
		190/220/380/440/50/3	M98738
		575/60/3	M98740

FIGURE 9

HEAD AND VALVE ASSEMBLY, RIGHT SIDE

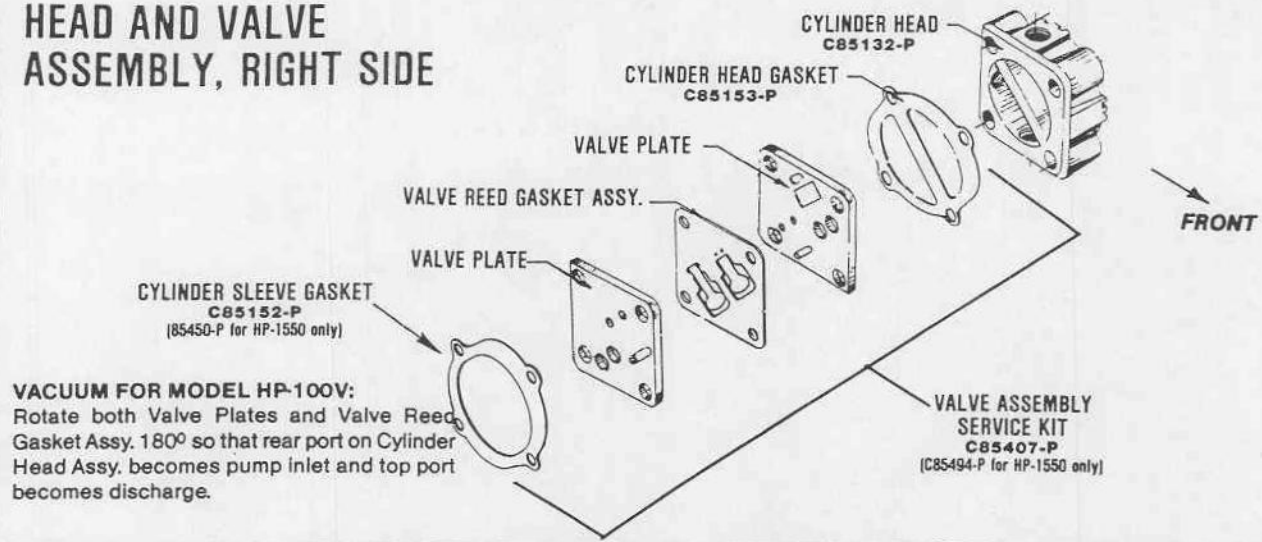
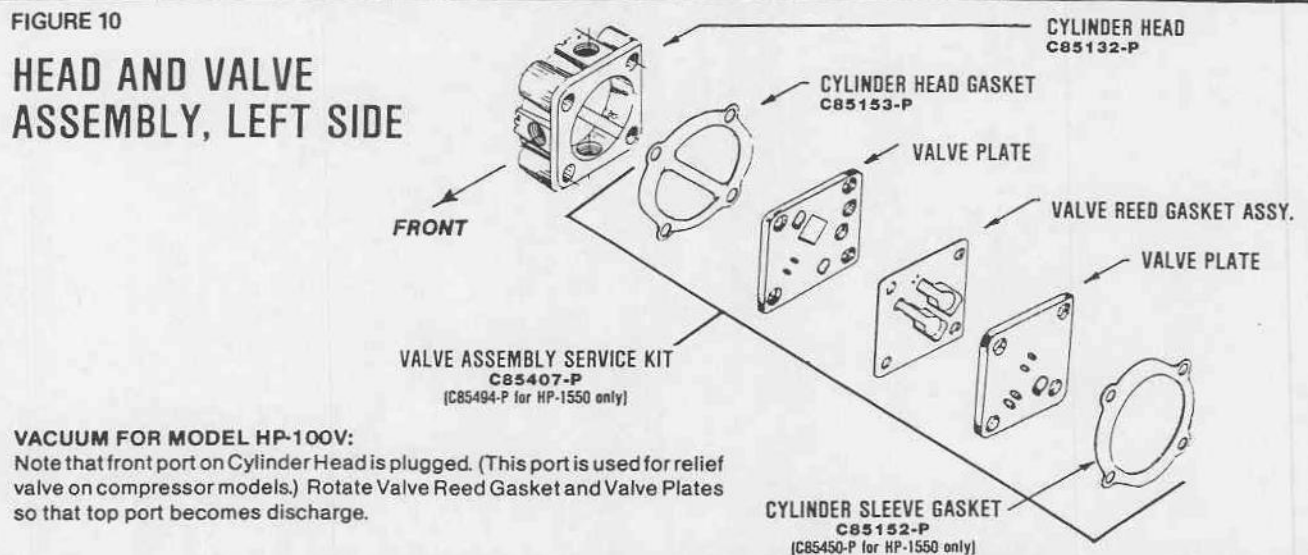


FIGURE 10

HEAD AND VALVE ASSEMBLY, LEFT SIDE



ROUTINE MAINTENANCE SCHEDULE

To insure optimum operation from the HP unit, the following maintenance procedures should be performed at the time intervals recommended below.

TIME INTERVAL

Daily

Weekly

Monthly

Semi-Annually

PROCEDURE

Drain all moisture traps in the system

Drain receiver moisture

Be sure inlet is open and clear

Check for leaks in the system

Check the operation of all safety devices in the system (relief valves, etc.)

Clean intake filter elements

Replace intake air filter elements

WARRANTY

A. WARRANTY- Pneumotive warrants that at the time of shipment, the products manufactured by Pneumotive will be free from defects in material and workmanship.

B. WARRANTY ADJUSTMENT

1. Pneumotive agrees to repair or at Pneumotive option, replace parts or parts which within twelve (12) months from date of original start-up or sixteen (16) months from date of factory shipment, whichever occurs first, shall upon examination by Pneumotive prove defective.

2. Buyer shall notify Pneumotive of any defect within this warranty period and deliver such defective parts no later than thirty (30) days after defective is discovered.

3. No product will be accepted for return or replacement without authorization by Pneumotive. Upon such authorization in accordance with instructions from Pneumotive, the product will be returned to Pneumotive, shipping charges prepaid by buyer. Products returned to Pneumotive to be addressed as follows:

Pneumotive
4601 Central Avenue
Monroe, Louisiana 71203
ATTN: RGA (Obtained Return Authorization Number)

Repair or replacement under this warranty will be returned freight prepaid.

C. EXCLUSIONS FROM WARRANTY

1. The foregoing warranty is limited solely as set forth herein and applies only for the period designated above.

2. Pneumotive shall not be liable for any loss, damage, special or consequential damage of any kind whether based upon warranty, contract, or negligence, arising in connection with the sale, use or repair of the product.

3. The maximum liability of Pneumotive under this warranty (or under any other warranty, expressed, implied, statutory, or otherwise) shall not in any case exceed the contract price for the product claimed to be defective.

4. Pneumotive shall not be liable for removal or installation of product claimed to be defective.

5. This warranty does not extend to any product manufactured by Pneumotive which has been subjected to misuse, neglect, accident, improper installation, or use in any manner contrary to Pneumotive instruction.

6. This warranty does not extend or apply to any product or parts of products which have been repaired or altered at any place other than Pneumotive Factory or factory authorized service centers no to any unit the serial number, model number, or identification of which has been removed, defaced, or changed.

7. Components manufactured by any supplier other than Pneumotive shall bear only that warranty made by the manufacturer of that product.

Modification

Unless otherwise provided, Pneumotive reserves the right to modify the specifications of the products offered by the Buyer, providing that the modification will not materially affect the performance.

Non Waiver

Any failure at any time of Pneumotive to enforce any provision of the sales agreement shall not constitute a waiver of such provisions or prejudice the right of Pneumotive to enforce such provisions at any subsequent time.

Limitation of Liability

Pneumotive will not be liable for any loss or damage, cost of repairs, incidental, special or consequential damages of any kind, whether or not based upon express warranty or implied warranty (except for obligations assumed by Pneumotive under the product warranty clause), contract negligence or strict liability arising in connection with the design, manufacture, sale, use or repair of the products. In no event will Pneumotive be liable to Buyer for any amount in excess of the purchase price of the product claimed to be defective.



THOMAS
INDUSTRIES INC.

PNEUMOTIVE

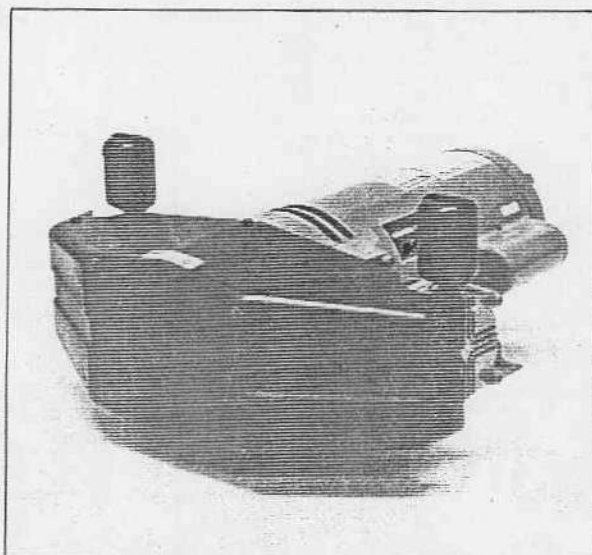
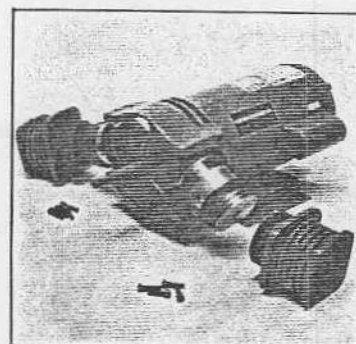
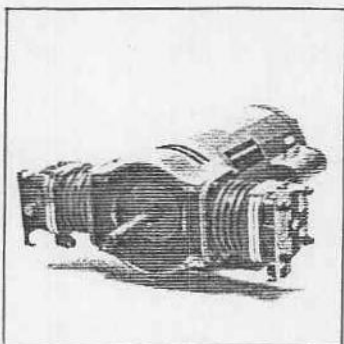
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PNEUMOTIVE SERVICE PROCEDURES

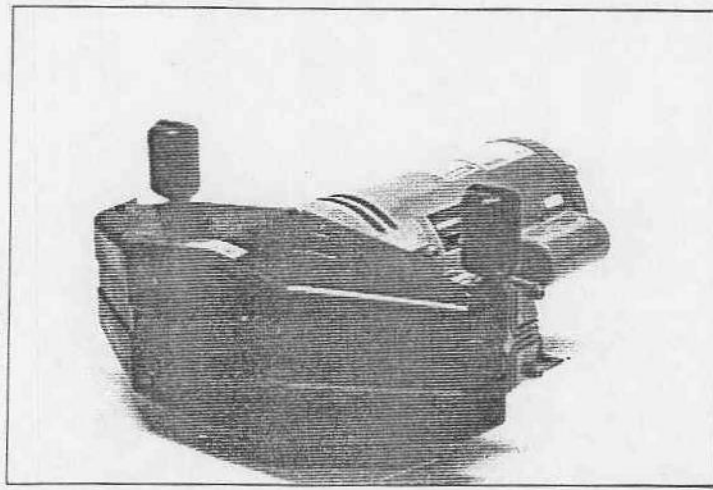
Oil-less
PISTON AIR COMPRESSORS



HP SERIES, 1 & 1-1/2 HORSEPOWER

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Compressor Assembly Procedures.....	14



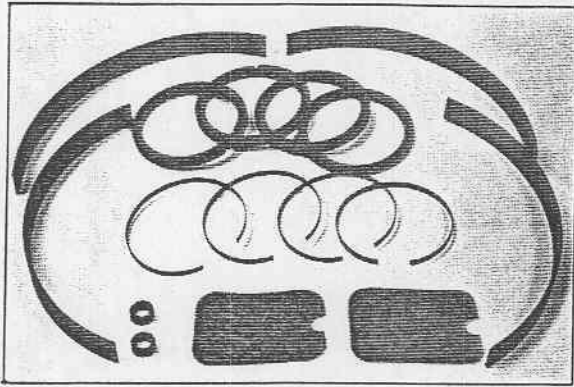
INTRODUCTION

This manual is intended to provide service personnel with an easy to follow guide for the disassembly, servicing and assembly of the two-cylinder, single-stage 1 and 1½ horsepower oilless air compressors. The manual is organized in a step-by-step sequence, first addressing the appropriate service kits and parts, next the tools required to perform the actual service work, then the complete disassembly and assembly of the compressor.

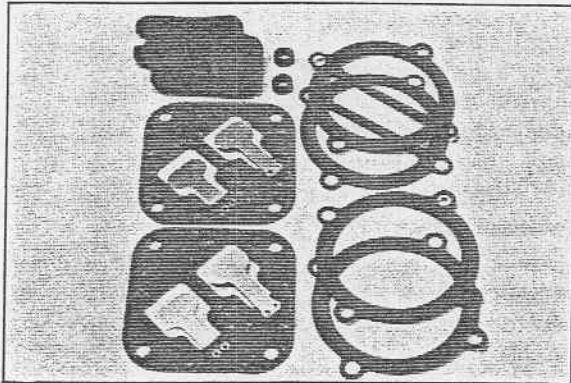
Prior to performing compressor service work, a thorough review of the entire manual is recommended. Additional consideration should be given to the following items:

1. Insure availability of all required parts and tools prior to starting any service work on the compressor. Service and tool kits are shown and fully described on Pages 6 & 7.
2. A detailed parts illustration on Page 8 shows the relationship of individual compressor components to the overall final assembly.
3. The 1 and 1½ horsepower compressors are considered identical as far as service procedures are concerned. The only differences in the units are in the contents of the MAJOR service kit and the electric motors required.
4. All references to RIGHT and LEFT are made when viewing the front of the compressor.
5. Always locate the compressor in a reasonably clean area where there is adequate room to disassemble and assemble the unit.

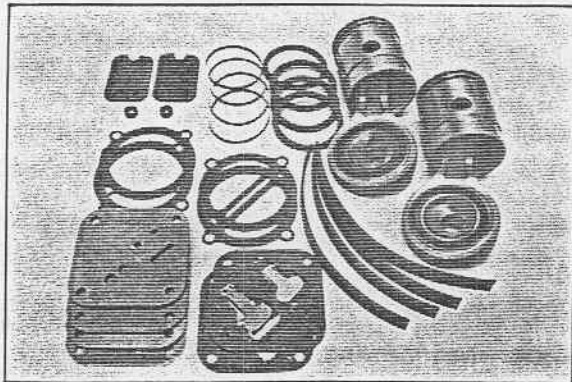
SERVICE KITS & TOOLS



The C85408 Minor Service Kit contains piston rings, ring expanders, piston skirts, compression ferrules and filter elements.



The C85407 Valve Service Kit contains the valve reed & gasket assemblies, cylinder head gaskets, cylinder gaskets, compression ferrules and filter elements.

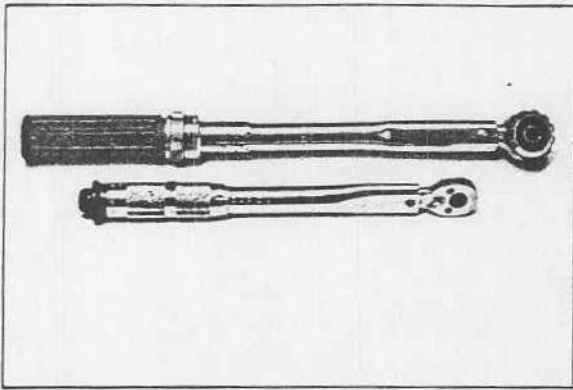


A typical Major Service Kit (C85409/1 h.p. & C85410/1½ h.p.) contains piston rings, ring expanders, piston skirts, compression ferrules, filter elements, valve reed & gasket assemblies, valve plates, cylinder head gaskets, cylinder gaskets, and piston & rod assemblies.



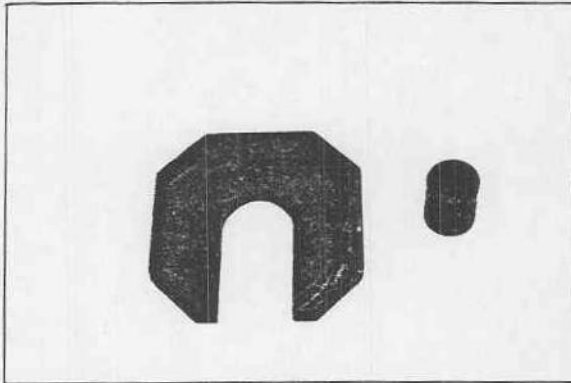
Standard shop tools required for compressor disassembly and assembly are:

- . 1/8" Allen Wrench
- . 1/4" Allen Wrench
- . Ball Peen Hammer
- . Screwdriver, 5" - 6"
- . Shop Punch
- . Crescent Wrench, 10"
- . Impact Wrench, 1/2" Drive

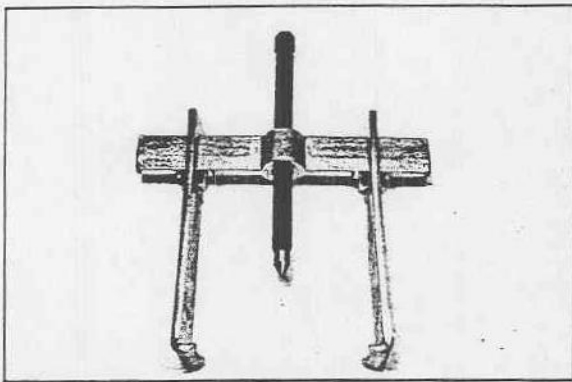


Two torque wrenches are required during compressor assembly. Recommended torque ranges are:

- . 0 - 100 ft. lbs.
- . 0 - 60 in. lbs.



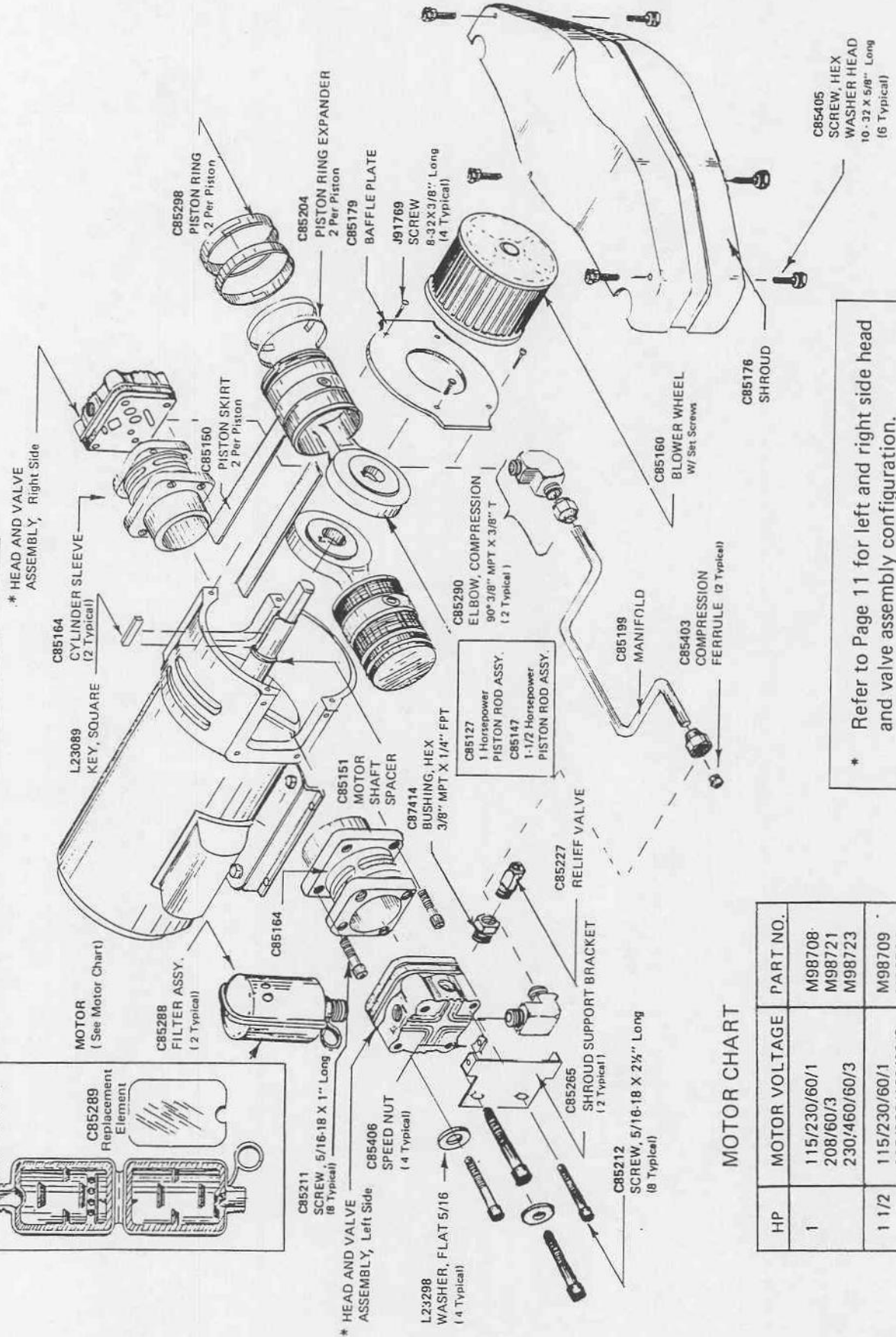
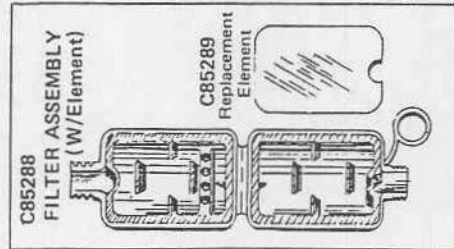
Other tools required for the removal of piston & rod assemblies are contained in the service tool kit, C85411. This tool kit consists of a puller backing plate and a shaft protector.



The only other tool necessary for compressor disassembly is a "PROTO" straight jaw puller, Proto Part No. 4232. It is commercially available through PROTO tool distributorships.

COMPRESSOR PARTS ILLUSTRATION

NOTE: See Pages 6 & 7 for detailed information on complete service kits available.

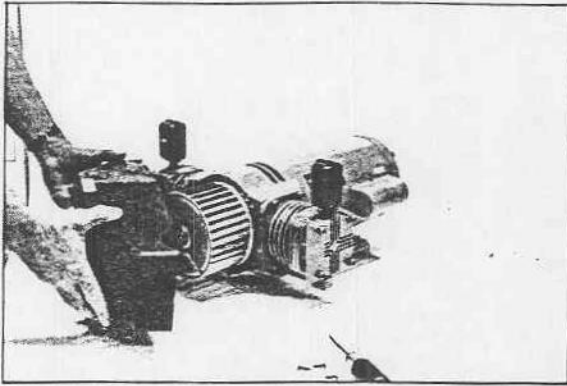


* Refer to Page 11 for left and right side head and valve assembly configuration.

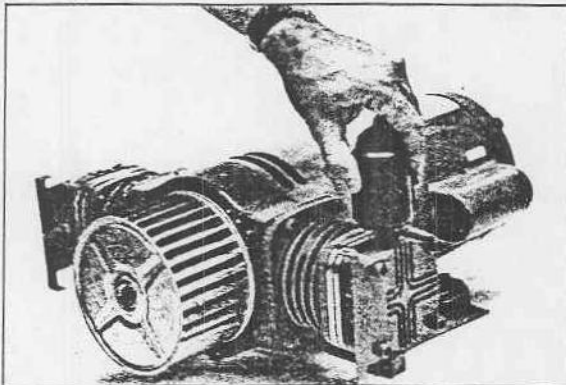
MOTOR CHART

HP	MOTOR VOLTAGE	PART NO.
1	115/230/60/1	M98708
	208/60/3	M98721
	230/460/60/3	M98723
1 1/2	115/230/60/1	M98709
	208/230/460/60/3	M98724

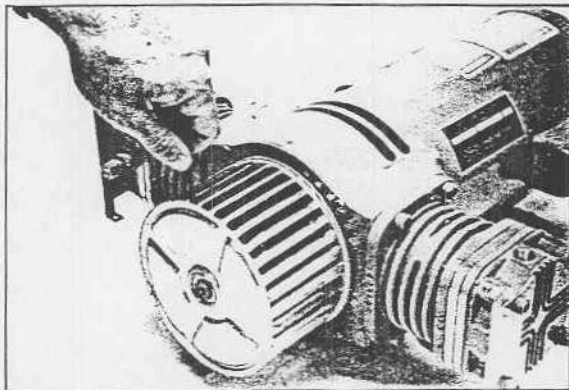
COMPRESSOR DISASSEMBLY PROCEDURES



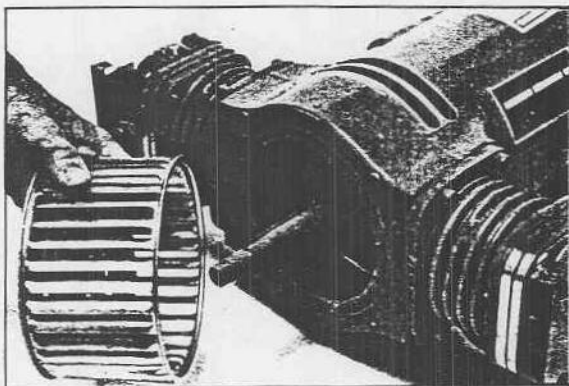
1. The initial step in compressor disassembly is removal of the shroud. First, remove the six hex washer head screws securing the shroud to the shroud support brackets.



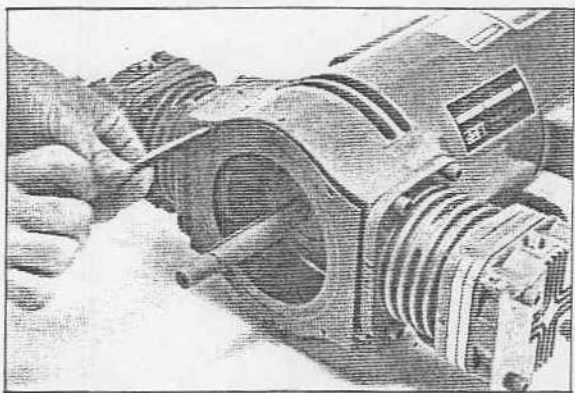
2. Next, remove the inlet filter assemblies. These have right-hand pipe threads and are removed by unscrewing the entire filter assembly from each cylinder head.



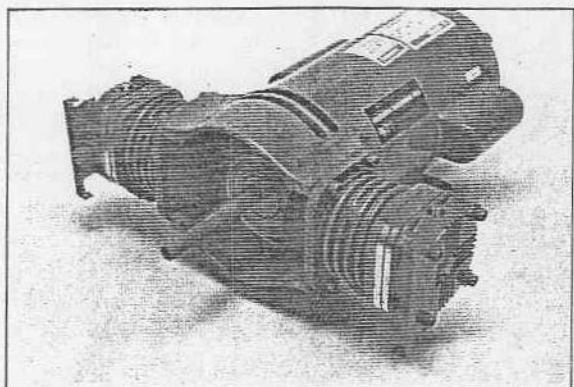
3. Using a 1/8" Allen wrench, loosen the set screws securing the blower wheel to the motor shaft.



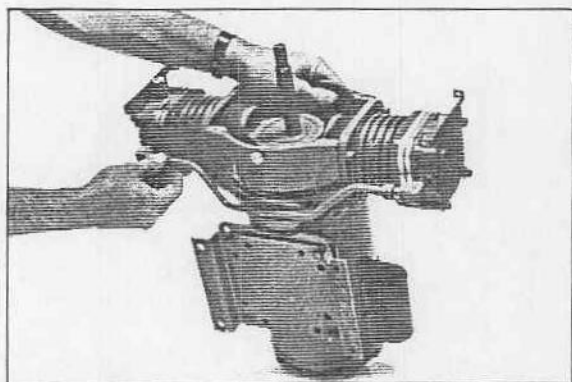
4. Remove the blower wheel.



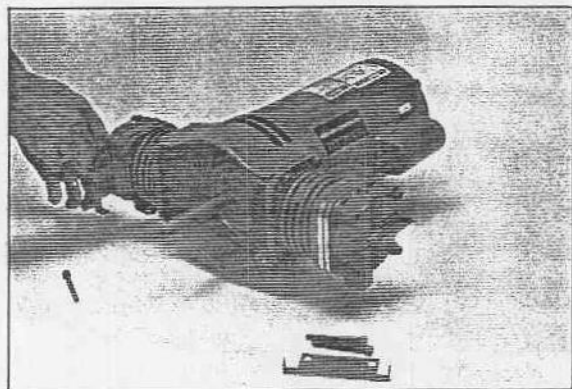
5. Then remove the four screws securing the baffle plate to the compressor and the baffle plate itself.



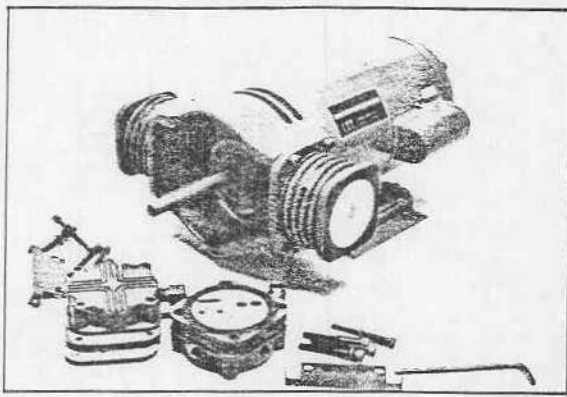
6. At this stage of disassembly, the compressor should appear as shown.



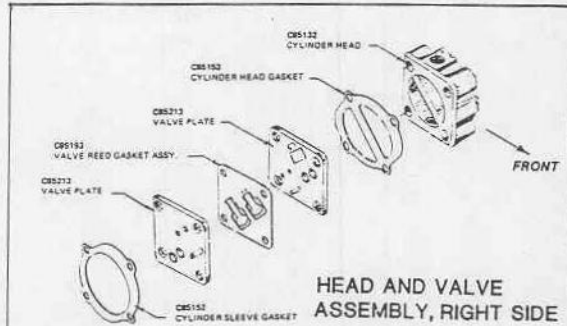
7. Using a crescent or 11/16" open end wrench, disengage the manifold compression fittings at the bottom of each cylinder head and remove the entire manifold assembly as shown. Care should be taken not to distort the manifold tubing.



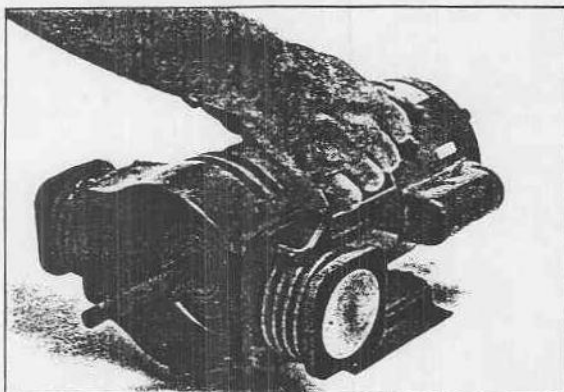
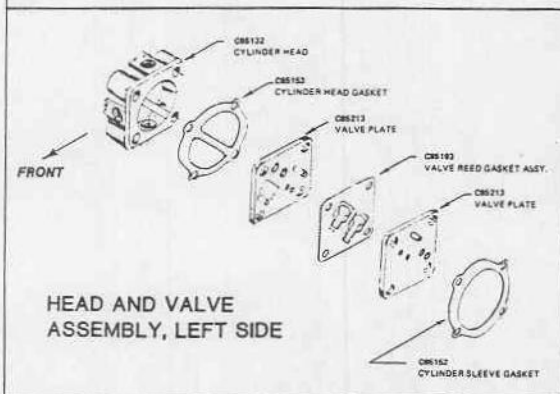
8. Next, remove the cylinder heads using a 1/4" Allen wrench. First remove the two socket head screws securing the shroud support brackets to the cylinder head. Remove each shroud support bracket, then the two remaining socket head screws on each cylinder head.



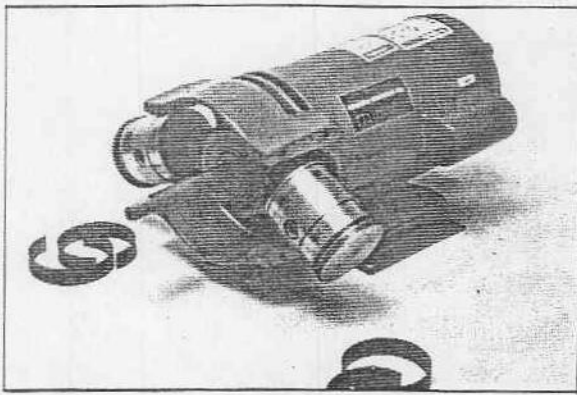
9. With the cylinder head & valve assemblies removed, the compressor should appear as shown.



10. Valve assembly inspection and service may now be performed. Illustrations shown at left depict the proper alignment of head & valve assembly component parts for each side of the compressor.



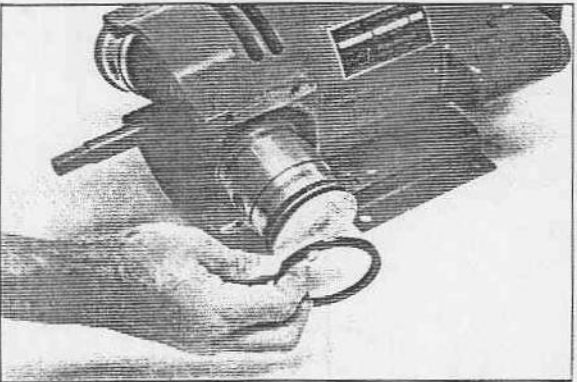
11. Rotate the shaft so that both pistons are at top dead center position. Use the 1/4" Allen wrench to remove the four socket head screws securing each cylinder sleeve to the compressor.



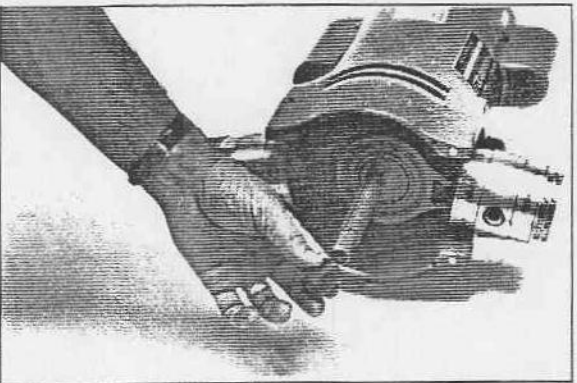
12. With both cylinders removed from the compressor, disassembly of the piston components can now be addressed. First, remove all piston skirts from pistons.



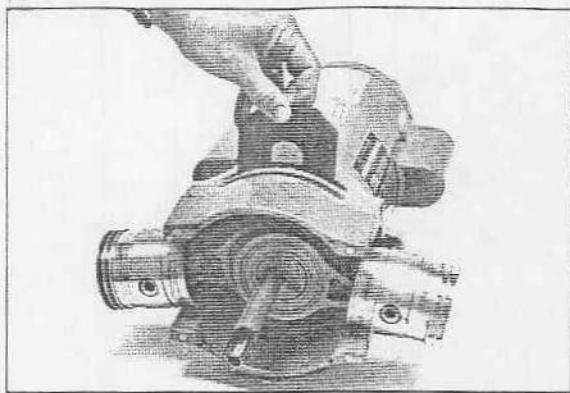
13. Removal of the piston rings is accomplished by grasping the ring near its gap and lifting one side of the ring from the piston ring groove.



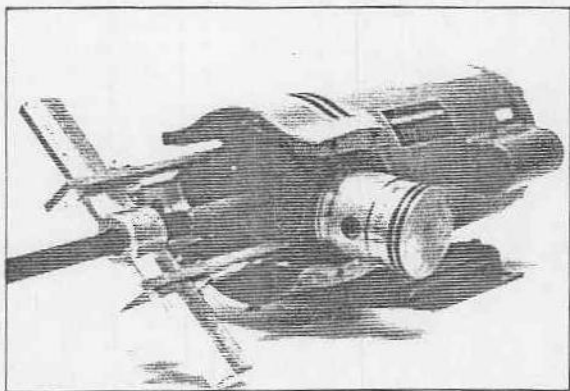
14. Continue lifting the ring from the piston ring groove in a spiral motion until the ring has been completely removed. Repeat this process for both pistons, then remove all four piston ring expanders.



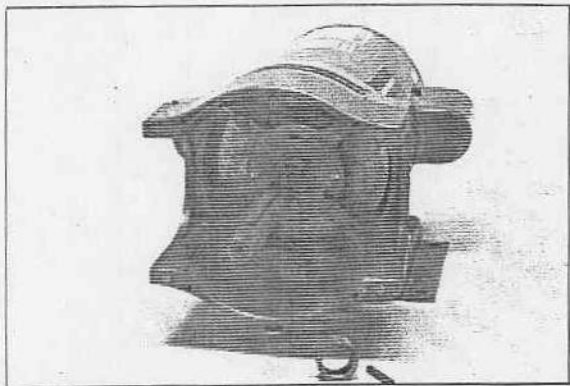
15. Position the shaft protector over the end of the motor shaft.



16. Insure shaft is rotated so that both pistons are at top dead center and insert the puller backing plate as shown. Position backing plate over the shaft, flat against the inboard connecting rod assembly, with the plate rotated 90° such that slot in plate is horizontal.

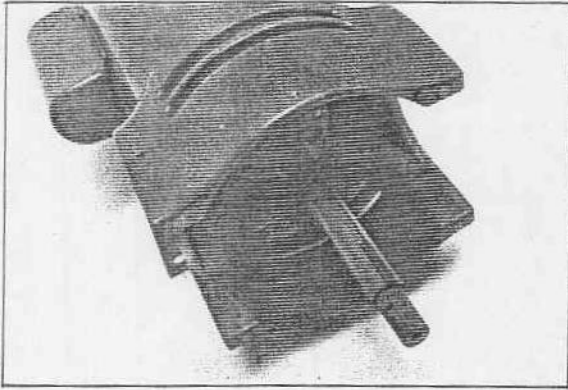


17. Carefully position puller jaws over the backing plate. Using the 1/2" drive impact wrench, slowly tighten the threaded center puller rod against the shaft protector. Maintain straight puller alignment throughout the complete removal process to insure equal pulling force on each side of connecting rod assemblies. Using this procedure both piston & rod assemblies will be removed simultaneously. Remove the square key and the motor shaft spacer located at the rear of the shaft.

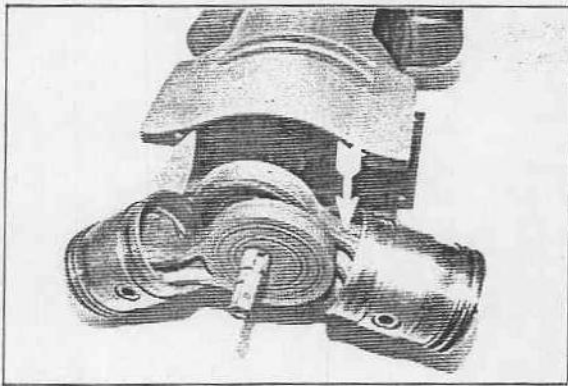


18. The compressor has now been completely disassembled and should appear as shown.

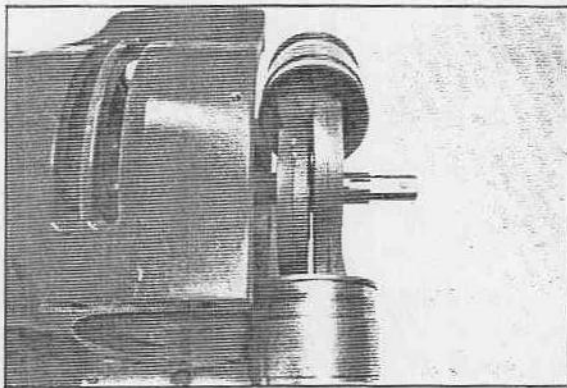
COMPRESSOR ASSEMBLY PROCEDURES



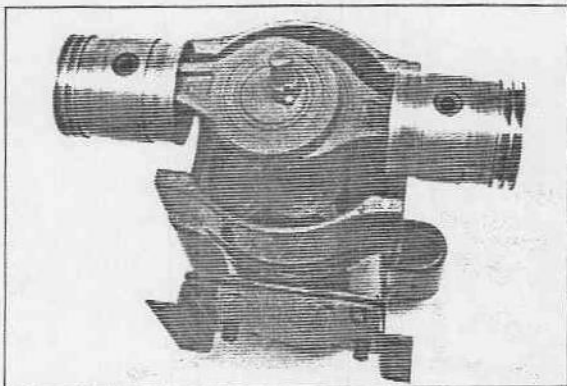
19. Begin by placing the shaft spacer on the motor shaft and slide it as far as possible to the rear. Then place the square key in the motor shaft keyway toward the front of the shaft as shown.



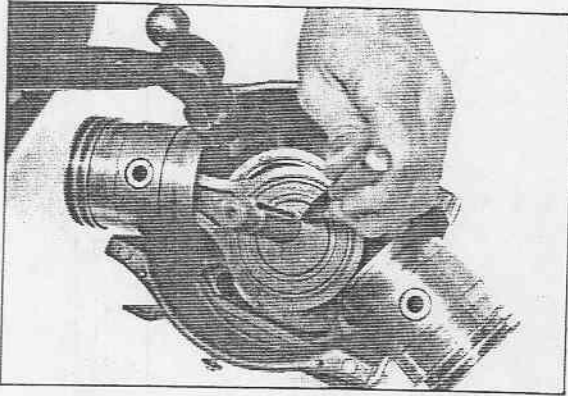
20. Slide the first piston & rod assembly onto the motor shaft insuring offset of connecting rod faces forward. Eccentric keyway should be aligned with square key in motor shaft keyway. Repeat the process for the second piston & rod assembly with the connecting rod offset facing the motor. The example shows the first piston & rod assembly extending to the right of the motor shaft and the second piston & rod assembly extending to the left. Installation may be made either way without affecting compressor performance as long as each respective connecting rod offset faces the other. (Arrow denotes connecting rod offset).



21. The piston & rod assemblies should make positive contact with each other at the point where the raised surfaces of each eccentric meet. The key must be secure in the keyway of the shaft and both eccentrics.

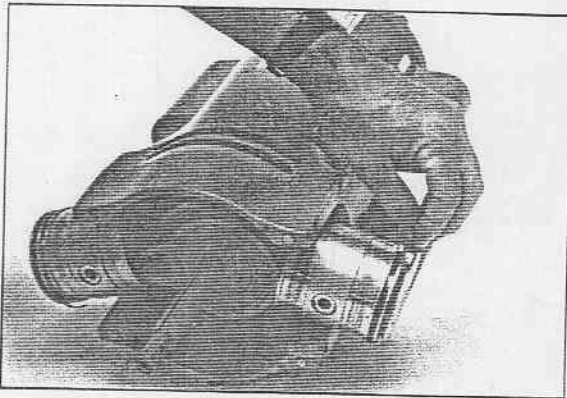


22. The piston & rod assemblies are now ready to be pressed firmly against the motor shaft spacer using a standard arbor press. Insure that the key is pressed on together with the piston & rod assemblies.

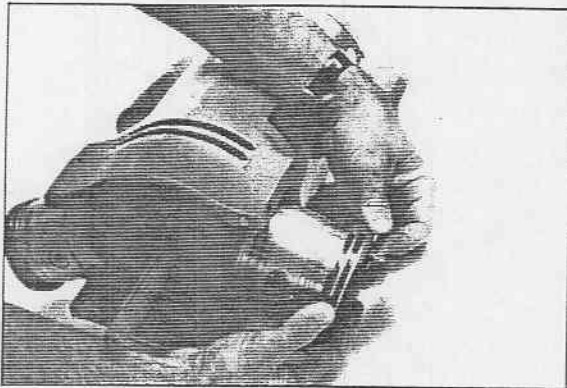


23. After completing the press procedure, peen over the leading edge of eccentric keyway on the outboard eccentric to prevent key movement.

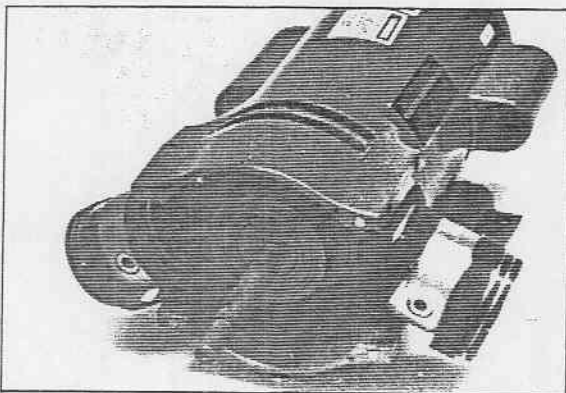
DO NOT PEEN SHAFT KEYWAY AS DAMAGE TO SHAFT MAY RESULT.



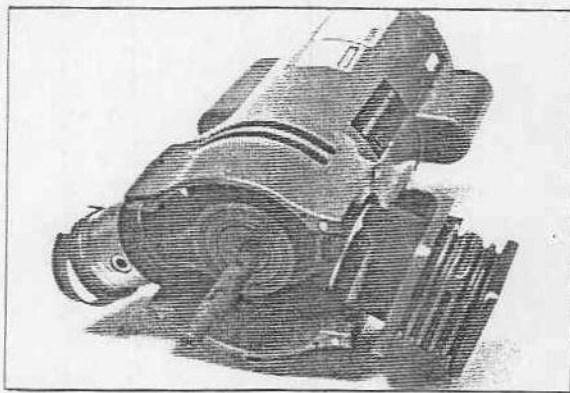
24. The next step is to assemble all piston components. First, install piston ring expanders in each of the piston ring grooves. Position expander gaps 180° apart.



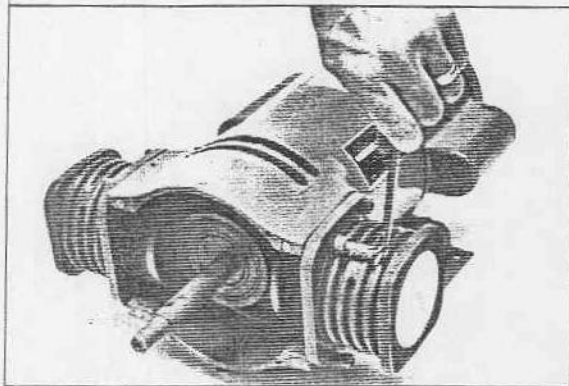
25. Next, install the piston rings. The lower ring should be installed first. Caution should be exercised when spreading the ring since it could break if spread too far. Each ring lap joint should be approximately 180° from the corresponding expander gap.



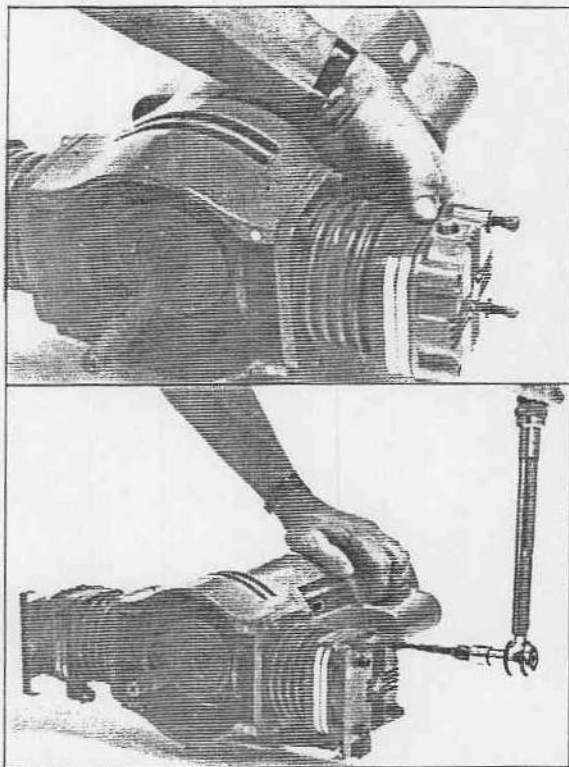
26. Install piston skirts. Roll form each skirt by hand to fit piston skirt groove contour. If desired, skirts may be held in place by rubber bands which should be broken and removed following installation of cylinder sleeves.



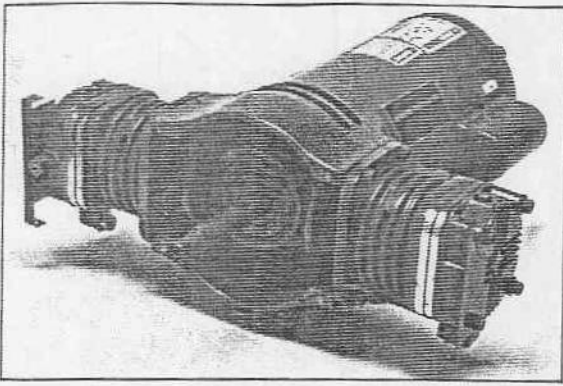
27. To start the cylinder sleeve over the first piston ring, gently compress the ring with one hand while working the leading edge of the cylinder sleeve over the part. Repeat this process on the next piston ring. As the sleeve is worked onto the piston, insure each piston skirt is in its groove and skirt joints are opposite each other.



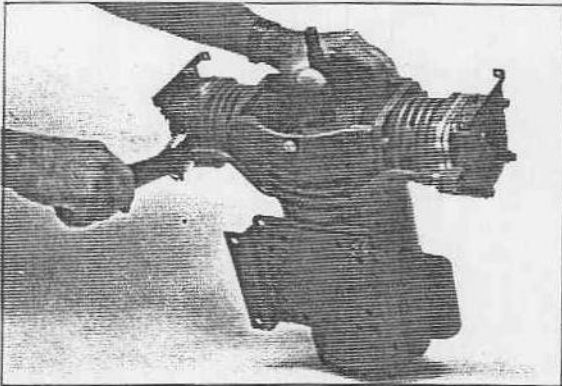
28. Complete cylinder sleeve installation and secure sleeve to the compressor with the four 5/16 - 18 X 1" socket head screws and torque to 20 ft-lbs.



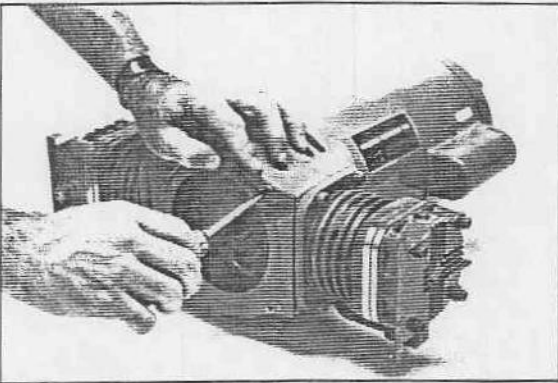
29. At this time the cylinder head & valve assemblies may be installed. Properly align the cylinder head & valve assembly on the cylinder sleeve and secure in place starting with the two rear 5/16 - 18 X 2 1/2" socket head screws. Use this same assembly procedure for installation of the remaining cylinder head, valve and shroud bracket assembly. Tighten and torque all eight cylinder head retaining screws to 25 ft-lbs.



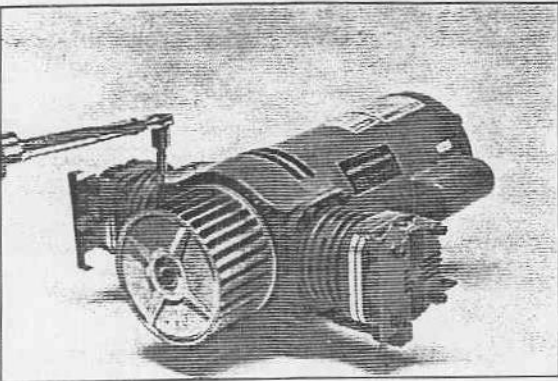
30. The partially assembled compressor should appear as shown.



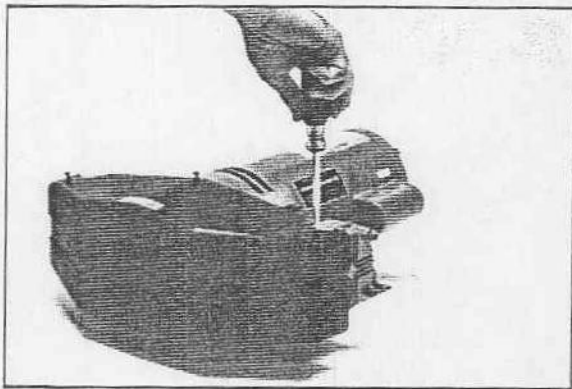
31. Next, install the manifold assembly into the appropriate compression fittings mounted to each cylinder head (use new compression ferrules, P/N C85403). Care should be taken not to distort the manifold tubing. Engage and tighten manifold fittings.



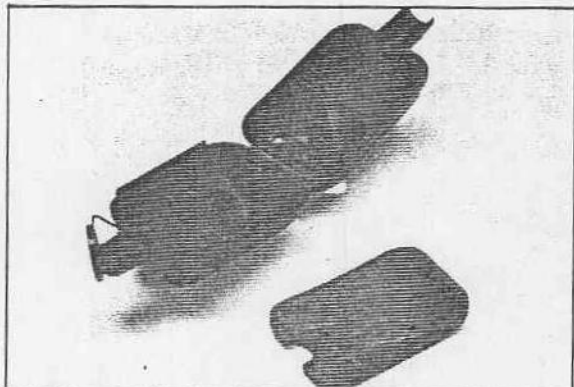
32. Replace baffle plate using the four 8 - 32 X 3/8" screws.



33. Install the blower wheel. Space blower wheel from baffle plate a nominal 1/16". Hand tighten one set screw against the flat surface of the motor shaft. Test spacing by hand turning the blower wheel one complete revolution. If blower wheel does not come in contact with baffle plate, then spacing is correct. If contact is made, adjust blower wheel slightly on shaft to eliminate contact. Once spacing is correct tighten both set screws and torque each to 45 in-lbs.



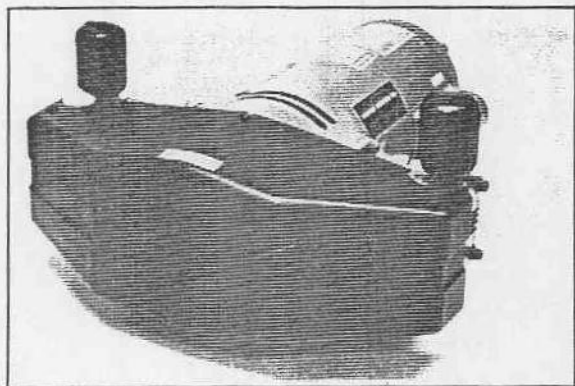
34. Install shroud using the six 10 - 32 X 5/8" screws.



35. Prior to installation of filter assemblies, install new filter felt elements. The felts are replaced by sliding the attached snap ring over the threaded halves of each filter housing, opening the housing and replacing the felt element. Close filter housing and secure with snap ring.



36. Install both filter assemblies.



37. The completed compressor assembly should appear as shown.